

HEARING ON ENERGY AND TAX POLICY

HEARING
BEFORE THE
SUBCOMMITTEE ON SELECT REVENUE MEASURES
OF THE
COMMITTEE ON WAYS AND MEANS
U.S. HOUSE OF REPRESENTATIVES
ONE HUNDRED TENTH CONGRESS
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HEARING ON ENERGY AND TAX POLICY

THURSDAY, APRIL 19, 2007

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON WAYS AND MEANS,
SUBCOMMITTEE ON SELECT REVENUE MEASURES,
WASHINGTON, D.C.

The Subcommittee met, pursuant to notice, at 2:00 p.m., in room B-318, Rayburn House Office Building, Hon. Richard E. Neal [Chairman of the Subcommittee] presiding.
[The advisory announcing the hearing follows:]

ADVISORY

FROM THE COMMITTEE ON WAYS AND MEANS

SUBCOMMITTEE ON SELECT REVENUE MEASURES

FOR IMMEDIATE RELEASE
April 12, 2007
SRM-3

CONTACT: (202) 225-5522

Chairman Neal Announces Hearing on Energy and Tax Policy

House Ways and Means Select Revenue Measures Subcommittee Chairman Richard E. Neal today announced that the Subcommittee on Select Revenue Measures will continue the Ways and Means Committee's series of hearings on energy and tax policy. The hearing will focus on the current framework of tax incentives encouraging the development of alternative sources of energy. **This hearing will take place on Thursday, April 19, 2007, in B-318 Rayburn House Office Building, beginning at 2:00 PM.**

In view of the limited time available to hear witnesses, oral testimony at this hearing will be from invited witnesses only. However, any individual or organization not scheduled for an oral appearance may submit a written statement for consideration by the Committee and for inclusion in the printed record of the hearing. A list of invited witnesses will follow.

BACKGROUND:

The Committee on Ways and Means has previously heard testimony on how the United States can help reduce the real and growing risks posed by climate change by encouraging the development and use of alternatives sources of energy. Tax incentives are one way in which the Federal Government can accelerate the development of these technologies. The tax code currently provides tax incentives encouraging the development of alternative sources of energy. The industries utilizing these incentives are best positioned to describe the utility of tax incentives in helping develop and expand these innovative technologies.

In announcing the hearing, Chairman Neal said, **"We need to know which current tax incentives are working and which are not so that we can take that knowledge and apply it to future policy decisions. This hearing will take a deeper look into our tax code to find out if there are ways to update and improve existing tax incentives that encourage the development of alternative sources of energy."**

FOCUS OF THE HEARING:

This hearing will focus on the utility of tax incentives in encouraging the further development, expanded production, and increased utilization of clean and renewable energy.

DETAILS FOR SUBMISSION OF WRITTEN COMMENTS:

Please Note: Any person(s) and/or organization(s) wishing to submit for the hearing record must follow the appropriate link on the hearing page of the Committee website and complete the informational forms. From the Committee homepage, <http://waysandmeans.house.gov>, select "110th Congress" from the menu entitled, "Committee Hearings" (<http://waysandmeans.house.gov/Hearings.asp?congress=18>). Select the hearing for which you would like to submit, and click on the link entitled,

“Click here to provide a submission for the record.” Once you have followed the on-line instructions, completing all informational forms and clicking “submit” on the final page, an email will be sent to the address which you supply confirming your interest in providing a submission for the record. You **MUST REPLY** to the email and **ATTACH** your submission as a Word or WordPerfect document, in compliance with the formatting requirements listed below, by close of business **Thursday, May 3, 2007**. Finally, please note that due to the change in House mail policy, the U.S. Capitol Police will refuse sealed-package deliveries to all House Office Buildings. For questions, or if you encounter technical problems, please call (202) 225-1721.

FORMATTING REQUIREMENTS

The Committee relies on electronic submissions for printing the official hearing record. As always, submissions will be included in the record according to the discretion of the Committee. The Committee will not alter the content of your submission, but we reserve the right to format it according to our guidelines. Any submission provided to the Committee by a witness, any supplementary materials submitted for the printed record, and any written comments in response to a request for written comments must conform to the guidelines listed below. Any submission or supplementary item not in compliance with these guidelines will not be printed, but will be maintained in the Committee files for review and use by the Committee.

1. All submissions and supplementary materials must be provided in Word or WordPerfect format and **MUST NOT** exceed a total of 10 pages, including attachments. Witnesses and submitters are advised that the Committee relies on electronic submissions for printing the official hearing record.

2. Copies of whole documents submitted as exhibit material will not be accepted for printing. Instead, exhibit material should be referenced and quoted or paraphrased. All exhibit material not meeting these specifications will be maintained in the Committee files for review and use by the Committee.

3. All submissions must include a list of all clients, persons, and/or organizations on whose behalf the witness appears. A supplemental sheet must accompany each submission listing the name, company, address, telephone and fax numbers of each witness.

Note: All Committee advisories and news releases are available on the World Wide Web at <http://waysandmeans.house.gov>.

The Committee seeks to make its facilities accessible to persons with disabilities. If you are in need of special accommodations, please call 202-225-1721 or 202-226-3411 TTD/TTY in advance of the event (four business days notice is requested). Questions with regard to special accommodation needs in general (including availability of Committee materials in alternative formats) may be directed to the Committee as noted above.

Chairman NEAL. We began this process back in February, talking to scientists and experts on climate change and global warming. We urged Congress to act to reduce carbon dioxide emissions, which are a primary cause of global warming.

Today we will hear from some industry experts who will advocate for certain tax incentives to support or enhance alternative energy sources in carbon reduction. Next week we will hear from Members of Congress, who will share with us their ideas for tax incentives to help American go green.

Pick up any paper these days, and you are bound to see a number of stories on global warming, and how this country must go green to combat this serious threat. Being green is hot, not just in Hollywood, but here in Washington, too. Tom Friedman wrote—and I would recommend it to you—last week in the New York Times magazine section, “The concept of green has gone main street.”

So, is that enough to warrant the Committee's attention? I think it is really much more than a trend. As Friedman argues, going green is geostrategic, geo-economic, capitalistic, and patriotic. In essence, he says, "Green is the new red, white, and blue."

Already, a number of U.S. businesses have announced their proposals to go green setting specific energy efficiency targets. They have concluded that being green is good for the bottom line, as well as for the environment.

But Friedman is not the only one to assert that our energy independence is a national security issue. Even the military is trying alternative energy sources in the battlefield. Too much of our economy and national decisionmaking is influenced by the price of oil. To break that connection we need a thriving and independent alternative energy sector.

This Committee is here to review, and perhaps update or expand tax incentives for these alternatives renewable energy sources. We will hear that these incentives are still needed, to some extent, in order for these energy sources to remain competitive in the marketplace. So we are having these hearings, and I expect the full Committee to mark up tax legislation on these issues.

So I am pleased to welcome our witnesses today. Representing the American Wind Energy Association, we have Jaime Steve, who is the legislative director of the association.

Representing the USA Biomass Power Producers Alliance, we have Bill Carlson, the Chairman. Mr. Carlson is also a principal of Carlson Small Power Consultants, in California.

Testifying on behalf of the Geothermal Energy Association we have Karl Gawell, the Executive Director. While he has represented Geothermal for the last decade, I understand he also has a substantial background in wind energy, as well.

On behalf of the Solar Energy Industries Association, we have Rhone Resch, President of the association. Mr. Resch is a true believer in alternative energy. He has a six kilowatt photovoltaic system in his home.

Testifying today from the U.S. Fuel Cell Council, we have Robert Rose, the Executive Director.

From the Renewable Fuels Association, we have Bob Dinneen, the President and CEO. Mr. Dinneen is the ethanol industry's lead lobbyist in Washington.

We also welcome Dr. Nina Bergan French, Director of Clean Coal Combustion at ADA Environmental Solutions, Incorporated, a strong supporter of permanent and robust research tax incentives. Her company develops technology to measure and capture emissions.

We all look forward to your testimony today, and I would like to recognize my friend, Mr. English, for his opening statement.

Mr. ENGLISH. Thank you, Chairman Neal. I particularly want to thank you for calling this extraordinarily timely and important hearing. I am encouraged to see that you are clearly intending to build on the work of past Congresses in developing creative solutions to the energy challenges facing our nation.

As you know, the Energy Policy Act of 2005 provided an unprecedented amount of tax incentives for alternative, clean, and renew-

able energy. In fact, that bill enacted tax incentives for every one of the technologies represented by the witnesses here today.

It is really an exercise and a matter of common oversight to determine whether we should continue to offer these tax subsidies, and what level, and for how long. There is no doubt that renewable energy resources, including eternal ones, such as wind power and solar energy, have a critical role to play in the energy—the future energy portfolio of this country.

We cannot ignore practical realities, however, as we consider how to enhance climate change and energy independence for the coming decades. I recognize that the Energy Information Agency predicts in its 2007 energy outlook report, that by 2030, wind energy may only increase from .4 to .9 percent of the total electricity generated in the United States.

As a long-time supporter of wind energy, I think wind energy is important. But by contrast, more than half of the electricity generated in this country comes from coal. This country has massive reserves of coal which could eliminate our dependence on foreign sources of energy for many decades to come.

In my view, any proposal to address climate change and energy independence which does not provide for options like clean coal technology may be inadequate.

That is why the 2005 energy bill included a number of incentives for advancing clean coal energy. This Congress should use the opportunity this hearing presents to explore what else we could, and should do. The promise coal gasification technology holds is to deliver cheap oil or no carbon power.

New possibilities exist for other cutting edge technologies in areas like nuclear, oil shale, and geothermal. We can assess these based on science, not ideology or politics. The promise of alternative energy is great, and I look forward to working with you, Mr. Chairman, and with the majority in drafting legislation to help advance these technologies. And I thank you for the opportunity to comment.

Chairman NEAL. Thanks, Phil. And now, we would like to recognize Mr. Herger, who, I believe, would like to greet personally one of his constituents.

Mr. HERGER. Thank you very much, Chairman Neal, and Ranking Member English. I would like to welcome a constituent of mine, Bill Carlson, who will testify on behalf of the USA Biomass Power Producers Alliance. Bill, it is good to see you again.

A resident of Redding, and our—California's—second Congressional district, Bill is retired from years with Shasta Wheelabrator Technologies and Energy Company, as a consultant. Bill has spent the majority of his career advancing the interests of the open-loop biomass industry, and has seen or helped install almost all, if not all, of the open-loop facilities in the United States.

Thank you for testifying for us today, Bill. Thank you, Mr. Chairman.

Chairman NEAL. Thank you, Wally. Without objection, any other Members wishing to insert statements as a part of the record may do so. And all written statements made by the witnesses will be inserted into the record, as well. Mr. Steve, thank you for being here.

Mr. STEVE. Thank you.

**STATEMENT OF JAIME STEVE, LEGISLATIVE DIRECTOR,
AMERICAN WIND ENERGY ASSOCIATION**

Mr. STEVE. Thank you, Mr. Chairman. Members of the Committee, thank you. My name is Jaime Steve, and I serve as Legislative Director of the American Wind Energy Association, based here in Washington, D.C.

Mr. Chairman and Members, today's typical wind turbine can generate as much as 2 megawatts of electricity, or enough power for about 540 households. It is also interesting to note that Texas is now the number one producer of wind power in the United States. That was a claim held by California for the last 20 years.

Also interesting, the Statue of Liberty's torch is currently powered through a purchase of wind power. Starbuck's, Safeway, and Staples are all purchasing wind power electricity.

Examples of wind energy jobs include 500 workers building towers at Beaird Industries in Shreveport, Louisiana, and another 350 workers building towers in DMI Industries in West Fargo, North Dakota.

The most interesting point is that wind developers pay roughly \$5,000 in rental fees—\$5,000 per wind turbine—per year for 20 years. That is a lot of income to the farmer, or rancher, or another land owner. And that is happening from Maple Ridge, New York, to Abilene, Texas.

My last example, an empty beer bottle, which I can assure you all that I liberated the contents of at a point prior to the beginning of this hearing—in an undisclosed time prior to the beginning of this hearing—but the point being that that entire beer produced by the New Belgium Brewery in Fort Collins, Colorado, is produced with 100 percent wind power. We are seeing this more and more.

These examples show that supporting wind and other forms of clean, renewable energy means creating jobs, spurring rural economic development, stemming global warming, and enhancing our National energy security. And the best ways to invest in rural energy are long-term extensions at full value of the existing provisions for renewals.

The production tax credit, which expires December 31, 2008—not that far away, is less than 2 years from now. Extending the existing solar investment tax credit, but also opening that up for use by small wind turbines, much smaller type of wind turbine, which you have probably seen elsewhere, something that you could use to power your own home, your own farm, or small business. Last, clean renewable energy bonds, which help non-tax paying entities, and public power entities.

These incentives are needed, because wind energy is not yet fully cost competitive with mature electric generation technologies. In fact, over the last 2 years, wind energy costs have been increasing, making the Production Credit of full value even more crucial than before.

First, I would like to thank Representative Pomeroy and Representative Ramstad for their bill, H.R. 197, aimed at providing a 5-year extension of the Production Tax Credit at full value. The bill now has 85 cosponsors, 10 of whom serve on the full Committee.

I would also like to thank Representatives Blumenauer and Cole for their bill, H.R. 1772, to open the separate investment tax credit for the solar that I referred to, and open that up to the small wind systems.

One thing that we have seen over time is that these issues are—always have been, on this panel, very bipartisan issues, and we are very proud of that. Since 1999, the PTC, the Production Tax Credit, has expired and been extended 5 times—that's since 1999—always for short, 1 or 2-year periods, and more often than not, with economically painful periods of expiration for the industry.

The effect has been to create a boom-and-bust cycle within the industry, which stops us from achieving further cost reductions and holds us back from our potential. Simply stated, when the credit is available, we produce jobs and clean energy. When it is not available, we lose jobs and we produce very few new projects. Access to a long-term PTC can break this boom-and-bust cycle.

Another piece of background. In 1998, wind energy produced roughly enough electricity to power about 500,000 homes in the U.S., and wind was virtually a California-only industry. Today, Texas has surpassed California, as I mentioned, and we're operating in over 30 states and producing about—enough power for about 3 million American homes. That's roughly all of the homes and all of the population of the state of Virginia.

We have come a long way. But this growth has been driven by short-term Production Tax Credits. What we need is a long-term credit. With a long-term credit we can do so much more. A long-term Production Tax Credit would spur increased development of wind and other renewables, while also creating much-needed manufacturing jobs, particularly in the Midwest, which we have seen, particularly in the auto industry.

A long-term extension would also reduce the cost of wind power to consumers. A 10-year Production Tax Credit would deliver thousands of megawatts of new power, and a 15-percent reduction in the cost of wind power. A shorter, 5-year extension would produce about half of those benefits. What we are looking for is the ability to plan, invest, and create new jobs. And that would reduce prices in the long run.

In conclusion, Mr. Chairman, to keep providing these new jobs, spurring economic development, and addressing global warming, the wind industry—and all the industries, really—need long-term credits. We ask the Congress to pass long-term extension of these credits, the full value, so we can keep the tower factories humming from Shreveport, Louisiana to West Fargo, North Dakota. Keep producing more wind power in Texas, of which we're just booming in Texas, and keep producing from Maple Ridge, New York, all the way to Abilene. Thank you very much.

[The prepared statement of Mr. Jaime Steve follows:]

Statement of Jaime Steve, Legislative Director, American Wind Energy Association

Chairman Neal and Members of the committee, my name is Jaime Steve and I serve as Legislative Director for the American Wind Energy Association (AWEA) based here in Washington, D.C.

Mr. Chairman, today's typical wind turbine can generate as much as two megawatts of electricity, or enough power to meet the needs of about 540 households. It is also interesting to note that:

- Texas is now the #1 wind-producing State in the nation, having recently surpassed California which held that claim for over 20 years.
- The Statue of Liberty's torch is powered through a purchase of wind energy.
- Starbucks, Safeway, and Staples are all purchasing wind-generated electricity.
- Examples of wind energy jobs include 500 workers building towers at Beard Industries in Shreveport, LA and another 350 workers building towers at DMI Industries in West Fargo, ND.
- Wind developers pay about 5,000 per turbine, per year for 20 years in lease payments to hard-pressed farmers, ranchers and other land owners from Maple Ridge, NY to Abilene, TX. Wind projects also make significant contributions to the local tax base of many rural communities.
- A single wind turbine avoids the same amount of carbon dioxide as is emitted by about 4,800 cars.

These examples show that supporting wind and other forms of clean, renewable energy means creating jobs, spurring rural economic development, stemming global warming, and enhancing our national energy security.

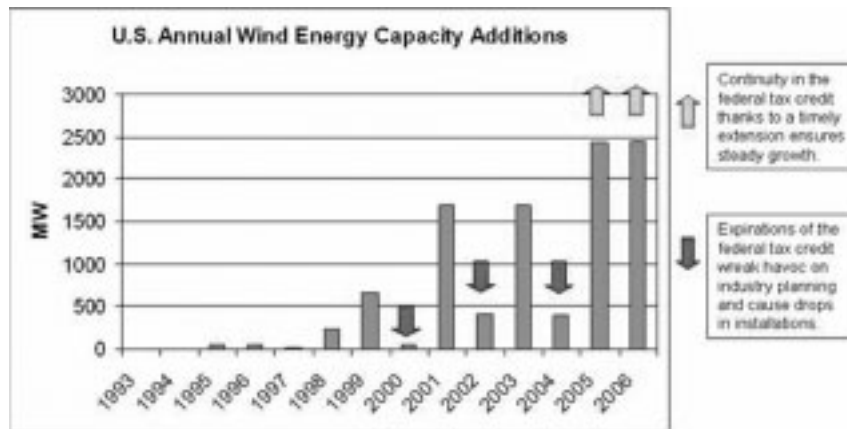
And, the best way to invest in renewable energy is through long-term extensions of the renewable energy tax credits and bonds, specifically:

- (1) The renewable energy *Production Tax Credit (or PTC)* which expires December 31, 2008
- (2) The existing solar *Investment Tax Credit*—with the addition of small wind systems used to power homes, farms, and small businesses, and
- (3) *Clean Renewable Energy Bonds* for non-taxpaying, public power entities.

These incentives are needed because wind energy is still not yet fully cost competitive with mature electric generation technologies. In fact, over the last two years, wind energy costs have been increasing, making the Production Tax Credit even more crucial than before.

First, a thank you to Reps. Pomeroy and Ramstad for their bill, H.R. 197, aimed at providing a 5-year extension of the PTC through December 31, 2013. This bill now has 75 cosponsors, ten of whom are Members of this panel. I also thank Reps. Blumenauer and Cole for their bill (H.R. 1772) to open the separate investment tax credit for solar power systems for use by individual landowners who purchase small wind systems. The history of these incentives in this committee clearly shows that support for renewable energy tax credits has always been a bipartisan issue.

Since 1999, the PTC has expired and been extended five times—always for short one- or two-year periods and more often than not with economically painful periods of expiration between extensions. The effect has been to create a boom-and-bust cycle that stops us from achieving further cost reductions and holds back our potential. Simply stated: when the credit is available, we produce jobs and clean energy—when it is not available we lose jobs and build very few new projects. Access to a long-term PTC can break this boom-and-bust cycle, and allow wind energy to become an even far greater contributor to our energy mix.



In 1998 wind energy produced enough electricity to power about 500,000 homes and wind was virtually a California-only industry. Today, Texas has surpassed California as the top wind energy producing state and high-tech wind turbines are operating in 30 states producing the equivalent amount of electricity needed to power about 3 million American homes—or, about the amount of energy used by the entire population of the state of Virginia. This growth has been driven in large part by access to short-term PTC extensions. Imagine what we could do with a long-term extension.

A long-term PTC would spur increased development of wind and other renewables, while also creating much-needed manufacturing jobs, particularly in the Midwest. A long-term extension also would reduce the cost of wind power to consumers. Industry estimates indicate that a 10-year PTC would deliver thousands of megawatts of new wind power and a 15 percent reduction in the cost of electricity produced from wind. A shorter 5-year extension would deliver about half as much power and about half (roughly 8 percent) of the cost reductions. In a nutshell, a long-term extension would eliminate the every-other-year turbine manufacturing cycle by allowing large investments in the supply chain for turbine components. This ability to plan and invest would create jobs, and reduce costs and stem price increases for wind turbines, thus lowering energy costs to consumers.

Conclusion

Mr. Chairman, to keep providing new jobs, spurring rural economic development and addressing global warming, the wind industry needs long-term access to renewable energy production tax credits, investment tax credits and bonds.

We all ask Congress to pass long-term extensions of these tax credits at full value so that we can keep the tower factories humming from Shreveport, Louisiana to West Fargo, North Dakota. We'll also keep making much-needed land rental payments to farmers and ranchers, from Maple Ridge, NY to Abilene, TX.

Thank you,

Jaime Steve, Legislative Director,
American Wind Energy Association
1101 14th Street, NW 12th Floor
Washington, D.C. 20005
202-383-2506

Background: The U.S. wind energy industry installed over 2,400 megawatts (MW) of new generating capacity in 2006, making wind one of the largest sources of new power generation in the country and a mainstream option with which to meet growing electricity demand. One megawatt of wind power produces enough electricity on average to serve 250 to 300 homes.

AWEA's annual industry rankings provide a standard reference point for tracking the growth of wind power in the U.S. The rankings (as of December 31, 2006) are the following:

Top Five Wind Energy Producing States

(Expressed in megawatts (MW) of capacity):

State	# of MW
Texas	2,768
California	2,361
Iowa	936
Minnesota	895
Washington	818

Texas is firmly established as the leader in wind power development, with over 2,700 megawatts of new wind generation installed at the end of 2006, and some 1,000 megawatts currently under construction. Iowa and Minnesota look likely to break the 1,000 MW mark in 2007. Washington will come close, with the 140-MW Marengo project that is currently under construction there.

Top Five Largest Wind Farms Operating in the U.S.

(Size is expressed in Megawatts (MW))

Project	# of MW	Project Owner
Horse Hollow, TX	1736	FPL Energy
Maple Ridge, NY	322	PPM Energy/Horizon Wind Energy
Stateline, OR & WA	300	FPL Energy
King Mountain, TX	281	FPL Energy
Sweetwater, TX	264	Babcock & Brown/Catamount

Five PTC expirations and extensions since 1993:

In place: January 1, 1993 through June 30, 1999

1) Credit expired: June 30, 1999

Extended: December 1999 through December 31, 2001 (credit made retroactive to July 1, 2001)

CREDIT *UNCERTAIN* FOR 6 MONTHS

2) Credit expired: December 31, 2001

Extended: March 2002 through December 31, 2003 (retroactive to January 1, 2002)

CREDIT *UNCERTAIN* FOR 3 MONTHS

3) Credit expired: December 31, 2003

Extended: September 2004 through December 31, 2005 (retroactive to January 1, 2004)

CREDIT *UNCERTAIN* FOR 8 MONTHS

4) Extended: August 2005 through December 31, 2007

FIRST TIME CREDIT EXTENDED BEFORE EXPIRATION DATE

5) Extended: Oct. 2006 through December 31, 2008

SECOND TIME CREDIT EXTENDED BEFORE EXPIRATION DATE

Chairman NEAL. Thank you, Mr. Steve.
Mr. Carlson?

**STATEMENT OF WILLIAM H. CARLSON, CHAIRMAN, USA BIO-
MASS POWER PRODUCERS ALLIANCE, REDDING, CALI-
FORNIA**

Mr. CARLSON. I would like to thank Mr. Herger for that wonderful introduction. Thank you. Mr. Chairman and Members of the Committee. The USA Biomass Power Producers appreciate the op-

portunity to appear today, representing the views of the nation's open-loop biomass power industry.

We represent more than 1,200 megawatts of baseload grid connected renewable electricity. I will identify the many unique environmental benefits provided by open-loop biomass, and urge the Committee to change the Production Tax Credit rules to place us on a level playingfield with other valuable and deserving renewable technologies.

The term biomass describes a wide variety of energy technologies. Today I am referring specifically to the production of electricity from the controlled combustion of untreated cellulosic solid waste, such as bark, orchard trimmings, rice hulls, and sugar bagasse. Qualified open-loop biomass facilities receive only one-half of the current PTC for their electricity, which creates issues I will describe.

In an national effort to limit greenhouse gases, you must understand that biomass electricity production is the only renewable that lowers net greenhouse gas emissions below a zero greenhouse gas emissions level. A recent California Public Utility Commission ruling states, "In particular, the record shows that electric generation using biomass that would otherwise be disposed of under a variety of conventional methods results in a substantial net reduction in greenhouse gas emissions. This is because the usual disposal options for biomass waste emit large quantities of methane gas, whereas the energy alternatives either burn the waste that would become methane, or burn the methane itself, generating CO₂. Since methane gas is on the order of 20 to 25 times more potent as greenhouse gas than CO₂, trading off methane for CO₂ emissions for energy recovery operations leads to a significant net reduction of the greenhouse effect."

Additionally, biomass power extends landfill life, eliminates air pollution from open burning, lowers the incidence of catastrophic Western forest fires, and restores forest health. Despite these benefits, the industry declined over 30 percent by 2005 from its 1990 peak of 135 facilities producing 2,300 megawatts due to low fossil fuel prices and contract buy-outs.

We thank the Members for recent actions stabilizing the situation for our industry. In the 2004 Jobs Act, Congress expanded the PTC to acknowledge, for the first time, the valuable contributions of open-loop biomass.

In the 2005 energy bill, the PTC was further modified to provide us a 10-year credit duration for new facilities. These actions, coupled with strong programs in numerous states, have arrested the decline in biomass power, and initiated a nearly 400 megawatt increase in capacity that will be completed by the end of next year, roughly a 20 percent rebound.

This increase consists of two business models: the restarting of closed biomass or converted coal plants; and the addition of combined heat and power installations at forest product facilities. These models are quicker and more economic than building a new greenfield facility.

Nationally, use of just these two business models grossly underutilizes a significant green, renewable resource. Currently, the combination of the high cost of greenfield development, and the

availability of only one half the PTC, prevents developers from being competitive in new capacity solicitations held by utilities under state renewable portfolio standard requirements. These widely used auctions are almost universally won by those receiving the full section 45 PTC.

The single most important thing that the Committee could do to foster the growth of biomass power and capture these unique environmental benefits is to approve legislation creating parity in the credit rate for biomass and other renewables with that of wind and geothermal energy. Only then will the nation be able to tap the thousands of megawatts of biomass power potential identified by the Western Governors' Association, 25x'25, and others.

I am pleased to announce that Representatives Herger and Meek of this Committee, yesterday introduced H.R. 1924, which would create such tax parity.

Another impediment facing our facilities is IRS Notice 2006-88, that requires facilities sited at industrial plants to net the electrical consumption of the industrial plant from the production of the biomass power facility, and claim the credit on only the net amount, if there is any, even if the biomass power facility is not serving the industrial facility electrical load.

The ruling would affect more than two-thirds of the biomass projects currently proposed, destroying their viability. Working with the American Forest and Paper Association, we urge you to include a reversal of this rule in any upcoming energy tax legislation. While EPA and DOE diligently work to encourage such highly efficient combined heat and power facilities, the IRS would eliminate them by this ruling.

In closing, let me reiterate that our number one priority is to achieve parity in the PTC tax credit to obtain more than a handful of new facilities a year. And to transform a portion of our Nation's electric supply from a major source to a negative emitter of greenhouse gases, the full credit is required. A simple extension of the credit will not bring the broader benefits of open loop biomass technology to the nation.

Thank you. I would be happy to answer any questions, and we hope that we can serve as a resource for your ongoing efforts.

[The prepared statement of Mr. William Carlson follows:]

Statement of William H. Carlson, Chairman, USA Biomass Power Producers Alliance, Redding, California

My name is William Carlson and I appreciate the opportunity to appear before the Subcommittee in my role as the Chairman of the Steering Committee of the USA Biomass Power Producers Alliance (USABPPA), representing the views of the nation's open-loop biomass power industry. USABPPA is the only trade group organized solely to represent the nation's grid connected biomass power supply, and as of today we represent more than 1,200mW of base load renewable electricity. The thrust of my testimony today is to identify the many unique environmental and other public benefits provided by open-loop biomass, and to urge the committee to change the production tax credit (PTC) rules to place this technology on a level playing field with other valuable and deserving renewable technologies.

As you know, the term biomass can be, and is, used to describe a very broad variety of energy technologies. In my testimony today, I am referring to the production of electricity from the controlled combustion of untreated solid cellulosic wastes such as bark, orchard trimmings, rice hulls and sugar bagasse. These production facilities generate firm base load power that provides local voltage support and enhanced reliability, and is added in small disbursed increments that do not require transmission system upgrades. Qualified open-loop biomass facilities are eligible to receive only

one-half of the current PTC for their electricity, which creates issues I will describe later in my testimony.

To see the potential role of open-loop biomass as a necessary component in any national effort to limit greenhouse gases, it is important to understand that open-loop biomass electricity production is one of the few renewables that lowers net greenhouse gas (GHG) emissions below a zero greenhouse gas emission level. This is because biomass waste materials, an unavoidable fact of modern life, disposed of conventionally (landfilling, onsite decomposition, open burning) all generate substantial quantities of methane, a very damaging greenhouse gas, while biomass power converts all that potential methane to CO₂, resulting in a net negative greenhouse gas emission profile. California has now formally recognized this benefit, in a California Public Utility Commission ruling in CPUC Decision 07-01-039, which implements SB 1368, the GHG emissions performance standard: "In particular, the record shows that electric generation using biomass (e.g., agricultural and wood waste, landfill gas) that would otherwise be disposed of under a variety of conventional methods (such as open burning, forest accumulation, landfills, composting) results in a substantial *net reduction* in GHG emissions. This is because the usual disposal options for biomass wastes emit large quantities of methane gas, whereas the energy alternatives either burn the wastes that would become methane or burn the methane itself, generating CO₂. Since methane gas is on the order of twenty to twenty-five times more potent as a GHG than CO₂, and since methane has an atmospheric residence time of twelve years, after which it is converted to atmospheric CO₂, trading off methane for CO₂ emissions from energy recovery operations leads to a significant net reduction of the greenhouse effect."

Additionally, biomass power extends landfill life, eliminates air pollution from open burning of agricultural and forestry residuals, helps lower the incidence of catastrophic Western forest fires, and allows cost effective restoration of our nation's overstocked and unhealthy forests, resulting in better watershed health, wildlife habitat, forest fire resilience, improved growth rates for enhanced carbon sequestration and overall forest health. The list of societal and environmental benefits from an expanded biomass power industry is long and impressive.

Historically, the national high-water mark for open-loop biomass facilities occurred around 1990, with an inventory of approximately 135 facilities producing as much as 2,300mW. From the early 1990s to 2005, the industry experienced a precipitous decline of approximately 30% of U.S. biomass power production due to the expiration of fixed contract rates and contract buyouts. Furthermore, changes in federal forest policies diminished the supply of materials flowing from National Forests, negatively impacting the fuel supply for many of the plants.

I wish to thank the Members of the Committee for their role in recent actions positively impacting open-loop biomass. In the 2004 JOBS Act, Congress expanded the PTC to acknowledge the valuable contributions of open-loop biomass and other renewable technologies (though at only ½ the rate of some other renewable technologies). Then, in the 2005 Energy Bill the PTC was further modified to provide all qualifying technologies with 10 year credit duration for new facilities.

The actions taken to date, coupled with strong positive actions by numerous states, have arrested this decline in U.S. biomass power production. The combination of federal and state actions has initiated a nearly 300mW increase in U.S. capacity since 2005 that will be completed by the end of this year, which is roughly a 15% rebound. An additional 100+mW is expected to be placed in service by 12/31/08 as a response to the extension of the PTC placed in service date enacted as part of the Tax Relief & Health Care Act of 2006. This increase in capacity is attributable to two factors—first, the restarting of biomass plants (and conversion of a couple of older coal-fired plants to biomass) that had been closed since the early 1990's and second, the addition of combined heat and power (CHP) installations at forest product facilities utilizing low valued mill residual materials. Restarting idle facilities and installing CHP at existing facilities takes less time and can be more economic than building a new greenfield biomass facility from the ground up.

In the scale of our national electrical power requirements, however, we are significantly underutilizing a significant green, renewable resource. Currently, the combination of the relatively high cost of new greenfield open-loop biomass power, and the availability of only one-half the PTC, prevents the open-loop operators from being competitive in the new capacity solicitations held by various utilities under state renewable portfolio standard (RPS) requirements. These auctions are almost universally won by those renewable technologies having access to the full Section 45 PTC.

Therefore, the single most important thing that the Ways & Means Committee could do to foster the growth of biomass power and thus diversify the types of renewable electricity within the nation's energy portfolio, is to approve legislation

equalizing the credit rate for biomass and other renewables by equalizing the PTC rate for open-loop biomass to that of wind and geothermal energy. Only then, will another 900 megawatts of biomass capacity in projects that have been identified and proposed become a reality and allow numerous other projects to enter the planning phase.

Another significant impediment to the production of electricity by open-loop biomass facilities is a rule published last year by the IRS that affects only biomass among renewable technologies. Under Notice 2006-88, facilities sited at industrial plants must net the electrical consumption of the industrial facility with the production of the biomass power facility and claim the credit on only the net amount, even if the biomass power facility is not serving the industrial facility electrical load. This ruling will affect more than 2/3 of the biomass projects currently proposed, destroying their viability.

The USABPPA, working with the American Forest & Paper Association, urges you to include a reversal of this rule in any upcoming energy tax legislation (a copy of a joint letter on this issue is attached to my testimony). Other federal agencies, such as the EPA and DOE, are working to encourage the very types of combined heat and power (CHP) cogeneration facilities that IRS would eliminate by this ruling. These CHP facilities are among the most efficient and cost effective ways to utilize biomass fuel and lower fossil fuel use. This type of activity should be encouraged by IRS regulations, not penalized.

Like other technologies on this panel, we would urge the Ways & Means Committee to extend the Section 45 Production Tax Credit beyond the current "placed in service date" expiration of December 31, 2008. Biomass projects not currently under equipment purchase and construction contracts are already halting planning and permitting activities until Congress extends Section 45. Like some other renewable technologies, new biomass power has a fairly long time horizon from conception to "placed in service", typically 3-4 years. Consequently, one long-term extension would send a more powerful market signal to investors than would a series of one and two year extensions.

In closing, let me reiterate that the No. 1 priority of the open-loop biomass power industry is to achieve parity in the PTC credit rate. To obtain more than five to ten new facilities a year, to obtain a significant number of completely new facilities, and to transform a portion of our nation's bulk electric supply from being a major emitter of greenhouse gases, not just to a neutral position, but to a negative emitter of GHG, the full Section 45 credit is required. Simply maintaining the Section 45 status quo via a "placed in service date" extension will not bring the broader benefits of open-loop biomass technology to the nation. Thank you again for this opportunity to present to the Subcommittee and I hope that USABPPA can serve as a resource to your ongoing efforts.

Chairman NEAL. Thank you.
Mr. Gawell?

**STATEMENT OF KARL GAWELL, EXECUTIVE DIRECTOR,
GEOTHERMAL ENERGY ASSOCIATION**

Mr. GAWELL. Thank you, Chairman Neal, and Members of the Subcommittee. I appreciate the opportunity to testify before you today. I am going to leave my statement in the record, and basically try to address what I think are some of the highlights for the Committee.

The first is most people don't know what geothermal energy is. We have produced in a few states, and Mr. Thompson and Mr. Herger know, because we are in their backyard. But you get outside of a few western states, and people aren't quite clear. What is this geothermal energy stuff?

But the states where we produce today, which are now five—Alaska has been added—like California, we are known as one of the most reliable baseload renewable power sources around. And we are seeing tremendous growth, and there is tremendous potential. Let me just point out, really quickly.

There have been three reports done in the last 6 months. One—this is just an executive summary by Dan Fleischman, who worked for us over a year, looking at what's happening today in the western states. And he found there is well over 100,000 megawatts of what's called conventional hydrothermal potential to be tapped if the economics is there.

There is also a report by the National Renewable Energy Lab, looking at geothermal energy in a variety of ways, and found several areas where 100,000 or more could be brought—co-production in the Gulf of Mexico, EGS, coal production from oil fields, as well as conventional hydrothermal.

And we probably—you may have all heard a bit about the MIT report that came out, which showed if you developed the engineering techniques to work the reservoir, you can expand this resource dramatically. What I am here to tell you is that that is what we're saying is happening today.

One of the things which the Energy Policy Act did was it gave geothermal a boost, and really started projects moving. A few years ago, I was asked by a Committee during the energy crisis in California, "How much could you bring online?" And we looked.

And, you know, step-outs of existing plants could come on quickly. We said, "Well, maybe you could see 300, 400 megawatts move out pretty quickly." Today, the survey I put in the testimony shows that we have identified, today, almost 2,000 megawatts of projects. I think we have 61 projects now moving forward. And I would say 80 to 85 percent of those came in after Energy Policy Act. A lot of those are in the early stages of development.

But what Energy Policy Act has done is really pushed the envelope. We have added a new state, we added Alaska. In the next 2 years, I suspect we will add Idaho, Wyoming, Oregon, Colorado, and Texas to the existing list of Utah, Nevada, Hawaii, California, and Alaska.

But where do you go from there? When you look at the MIT report, and you look at where they think you can go with this deep geothermal, or EGS, where the maps show you, you don't go to the full potential. You just go to a tier above it.

What you end up with is having Washington, Montana, South Dakota, Louisiana, Arizona, North Dakota, West Virginia, South Carolina, Illinois, Iowa, Nebraska, Arkansas, Florida, Tennessee, and on. You have 38 states that they feel you could do geothermal power potential with continued development of the industry and continued technology development. And that is what the PTC has started, it has helped us move in that direction.

What do we specifically need? I think Jaime Steve pointed out what all of us would say, is we need a long-term policy. We have all seen the roller coaster of energy policies. Remember the energy crisis? You turn around two days later and it's gone? Well, guess what? It is back again, and then it's gone again.

Our industries have been up and down, year after year. And even the 1970s, the big oil crisis. Most of the tax credits passed then were starting to be repealed two or three years later. Only PURPA really stayed in place to push new projects forward.

So, we need to have that long-term policy. We need a long-term extension of the tax credit. That's for sure. For my industry—and

I think others that produce baseload power plants, we are suggesting you also think about changing placed-in-service. Right now, the placed-in-service treatment under section 45 is all or nothing.

Vince Signorotti, from CalEnergy, sat before this Subcommittee in 2005 and told you we need a three-year extension to complete our plan. If we get a three-year Production Tax Credit, we will build it. The Energy Policy Act of 2005 came out just short, and just short of what they could do. That plant is not built. The economics were made by the Production Tax Credit, and their contract did not allow them to have multiple pricing. Some of the contracts some of our companies sign have two prices. One with and one without the tax credit. And so, that project doesn't move forward.

But if they had known then what a major power producer knew, that if you made the commitment, you've got that plant under construction today, that you could at least use the current placed-in-service deadline as your start—

Chairman NEAL. If it would be okay with you and Members of the panel, we have heard the call of the House, those are the bells. So we are going to go off and vote. And I would—this is great attendance that we have had. And if you give us about 15 minutes, we will be back.

[Recess.]

Chairman NEAL. Mr. Gawell, would you like to wrap up your testimony?

Mr. GAWELL. I will be glad to, Chairman, thank you. As I was saying, the way we can move forward, or I should say continue moving forward, like I said, lots have been happening. It's really been an exciting time in this industry. The way we can move forward is get a long-term extension of the credit. And, frankly, long-term policies across the board. That really helps people plan to build the infrastructure, and make things move forward.

We had long-term policies in the 1970s to early 1980s. I think all of the renewable technologies not only saw growth, but also saw cost reduction, too, because you saw the infrastructure being built and new projects coming on. So, long-term extension of the tax credit—5 to 10 years is critical.

The second thing is changing placed-in-service so that—we propose that baseload plants can qualify using the current placed-in-service date if they have a power sales agreement and they are actively under construction because they have already made the commitment to go ahead. Because that's when the company puts its money on the line, when it starts construction of a project. That's the big dollar event.

And the third item we have raised in our testimony is the issue of exploration. A lot of the resource in the United States is still difficult to find and high-risk. And from the time you do exploration to the time you build the plant can sometimes be as much as 10 years. So we suggested that the Committee consider exploration tax credit just for the exploration drilling expenses at the front end.

Those three things will go a long way toward pushing this even further, and I want to, I guess, close by saying it's—you know, for many years I was warned by my friends in the American wind energy industry to look out for what you ask for. They said, "Oh,

Karl, you don't realize this PTC, it's on again, off again. And, you know, if you get it, you're going to be in places like this saying, 'Gosh, we need it extended, because it was only two years, and then two years, and two years more.'"

And, now, I see what they were talking about, in terms of the short term of the credit. But I also want to say we're glad to be here, because of what we've seen happen in the last two years, since this credit was extended. We have gone from having, literally, a handful of projects under development to having dozens of projects under development in many new states. And I think that's what we can see, if the Committee can move forward with a long-term extension. Thank you, Mr. Chairman.

[The prepared statement of Mr. Karl Gawell follows:]

Statement of Karl Gawell, Executive Director, Geothermal Energy Association

Mr. Chairman and Members of the Subcommittee the Geothermal Energy Association (GEA) appreciates the Committee's interest in geothermal energy and its interest in the importance of tax incentives to this emergent industry.

The Energy Policy Act of 2005 (EPAct) has resulted in a major, positive impact on the geothermal energy industry. In November of 2006, GEA's survey of industry activity showed a substantial surge in developing geothermal power projects in the U.S. Some 61 projects were under various stages of development, a substantial increase from earlier years. Table 3, which is attached to this testimony, provides a summary of the survey's results.

The survey identified new power projects in Alaska, Arizona, California, Hawaii, Idaho, New Mexico, Nevada, Oregon and Utah. These projects, when developed, would provide just over 2000 MW of new electric power for the grid—enough electricity to meet the needs of cities the size of Albuquerque, Portland, Sacramento and Seattle combined.

Results of the survey provide dramatic evidence that new federal and state initiatives to promote geothermal energy are paying off. The most significant catalyst behind this new industry activity has been Congress' decision to extend the Section 45 Production Tax Credit (PTC) to include new geothermal energy facilities, which was initiated in 2004 and completed under EPAct of 2005.

Several provisions in EPAct were intended to promote geothermal energy development. First, Congress made new geothermal plants eligible for the full federal production tax credit, previously available only to wind and closed-loop biomass projects. Second, EPAct authorized and directed increased funding for research by the Department of Energy (DOE), and gave the Bureau of Land Management (BLM) new legal guidance and secure funding to address its backlog of geothermal leases and permits.¹

If we can build and sustain the momentum that EPAct has given the industry, geothermal energy can become a major U.S. energy source. The untapped potential of this resource is enormous. Today, geothermal energy provides nearly 3,000 MW of reliable electric power in the U.S. Recent reports by the GEA, National Renewable Energy Laboratory (NREL), and Massachusetts Institute of Technology (MIT) all point to a much larger for geothermal energy production from a range of technology applications.² Each of these studies supports the potential to achieve 100,000 MW or more from the geothermal resource base.

Geothermal's role among clean energy technologies is important to recognize. It is one of the few technologies that can supply, clean, reliable, low emission fuel that is also a baseload resource providing power 24 hours a day, 365 days a year. Geothermal energy could also support our national hydrogen initiative and nation

¹ The EPAct research initiatives have been totally undercut by Administration efforts to terminate geothermal energy programs at DOE, and regulations for the the leasing provisions have yet to be completed by the Department of the Interior, however.

² "An Assessment of Geothermal Resources Development Needs, by Daniel Fleischmann, GEA, January 2007 (<http://www.geo-energy.org/publications/reports.asp>); Geothermal—The Energy Under our Feet, by Bruce Green and Gerald Nix, National Renewable Energy Laboratory, November 2006 (<http://www.nrel.gov/docs/fy07osti/40665.pdf>); The Future of Geothermal Energy, An Assessment by an MIT-led interdisciplinary panel, January 2007 (<http://web.mit.edu/newsoffice/2007/geothermal.html>).

biofuels goals, both of which will require significant amounts of energy to produce alternative domestic transportation fuels.

Tax Policy Advantages of a Production Tax Credit

The structure of the Production Tax Credit is unique, and when first enacted in 1992 it represented a radical change from the Investment Tax Credit. The move to a production tax credit makes sense from a number of policy perspectives.

- The Production Tax Credit works—the PTC has historically been shown to stimulate new investment in wind energy;
- The Production Tax Credit encourages cost reduction and efficiency by rewarding investors based upon project output instead of total expenses; and,
- The Production Tax Credit requires production for the full period of the credit to ensure that projects are legitimate power producers and not tax credit “scams.”

Congress’ decision to expand the Production Tax Credit to include geothermal and other renewable energy resources was an appropriate policy choice.³ As the GEA survey shows, the PTC is having the desired effect. But, to make this truly effective, we urge Congress to extend the credit five to ten years. We also urge Congress to allow geothermal and other baseload projects to qualify once they have binding contracts and are under construction. Further, we urge Congress to enact a new tax incentive for geothermal exploration. We will discuss each of these proposals in turn.

Building Upon The Energy Policy Act

The Energy Policy Act of 2005 has helped launch a new era for the geothermal industry. But, as this Subcommittee knows, this legislation is only the beginning. As the November survey of new projects shows, many of these are in their early stages, and they will take several years to bring to fruition. These projects are just the beginning of what is possible.

Consistent federal and state policies over a longer period of time will be needed to spur develop of our largely untapped geothermal energy resources. The roller-coaster of federal and state energy policies has undermined the development of many clean technologies, including geothermal energy. It’s worth noting the recommendation by the Western Governors’ Association’s (WGA) Clean and Diversified Energy Advisory Committee (CDEAC): “A strong, overarching theme . . . is the need for stable, long-term policies at both the federal and state levels. . . .”

Energy is too often considered an issue of the moment, or the latest crisis. But to effectively address U.S. energy needs, the nation must adopt sustained longer-term energy policies. We hope that the Subcommittee will consider new energy legislation this session to build upon EAct and provide the long-term, stable policies needed through a long-term extension of the Section 45 tax credit. We would urge the Subcommittee to support a 5–10 year extension of the placed in service deadline.

The Developers Dilemma: Short Time Period to Meet Placed in Service Requirement and Long Construction Lead Times

The Energy Policy Act amended the Section 45 PTC to include new geothermal facilities, as well as several other renewable facilities, on the same basis as new wind facilities. The PTC gives the developer the incentive needed to choose to invest in geothermal energy. However, given the longer construction lead-time for geothermal plants—3 years or more—the short period the law allows for new plants to be placed in service undercuts its effectiveness. The short timeframe means that some of the largest new geothermal facilities may not go forward because they will not be able to meet the rigid deadline. Ideally, the placed in service deadline for the Section 45 PTC should be extended an additional 5–10 years and Congress should provide geothermal facilities greater flexibility in qualifying for the credit. If geothermal facilities that secure binding contracts and are under construction by the current deadline could be certain to qualify, substantial additional geothermal generation would be developed in the next few years.

In 2005, I accompanied Vince Signorotti of CalEnergy when he testified before this Subcommittee about the importance of the PTC to his company’s geothermal plans. He said:

We have a permit, so we could put shovels in the ground tomorrow. We have a customer—the Imperial Irrigation District—which strongly supports the develop-

³We believe Congress also intended the new Clean Renewable Energy Bond provision in EAct to promote geothermal energy, among the renewable technologies, and have supported the CREBS provisions as well.

ment of geothermal power and has signed a 30-year contract for 95% of the plant's output. We are also ready to go with financing and construction. However, the project is not yet commercially viable. Put simply, obtaining a production tax credit for this facility is the difference between an economically viable project and a dream. The present values of future production tax credits (especially if allowed for ten years of energy production) will launch this project and other geothermal projects around the country."

The first issue we ask you to address is the eligibility period. For geothermal projects, the placed-in-service date should be extended for an appropriate term to make the production tax credit viable. Given the construction time of most geothermal plants, the existing one-year eligibility period does nothing to help make our plant a reality and probably won't help other geothermal developers. Three years is the minimum needed to benefit most geothermal developers, who, like us, must deal with multi-year lead time challenges of planning, permitting, and construction. I therefore propose that you either extend the Section 45 placed-in-service date for at least three years or provide transition rules enabling new geothermal projects with binding contracts in place to qualify. This modification would more realistically help to achieve Congress' intent to provide an incentive for more geothermal development.

If Congress extends the production tax credit for geothermal energy in this manner, we will build this plant; it's that simple. And it will greatly increase the odds of seeing a Salton Sea 7, 8 and 9, because non-polluting, base load geothermal power is seen as an attractive substitute for coal and gas plants. The power from our plants near the Salton Sea can be directed west to San Diego, northwest to Los Angeles, northeast to Las Vegas, or east to Arizona. These are all areas with urgent needs for new, reliable electric power. They are having difficulty meeting current clean air requirements and they expect substantial growth in their power demands. While they are also subject to state or local renewable portfolio standards that mandate higher percentages of renewable energy, they are not likely to meet those standards in the absence of the production tax credit.⁴

Since that testimony, what has happened? Instead of extending the tax credit at least three years, Congress extended the production tax credit for a period of two years. As a result, instead of building one of the largest new geothermal power plants in the world—likely the first of several—CalEnergy has not built the power plant. As Vince said, "it's that simple."

Unfortunately, while EPAct has spurred significant new interest in geothermal power, the legislation has failed to spur the development of geothermal's full potential because of the short time-frame and "cliff" imposed by the current placed-in-service requirement. As Todd Raba, President of MidAmerican Energy Company (MEC) explained to the Senate Finance Committee in his March 29th testimony:

With regard to geothermal, hydro, biomass and waste-to-energy generation, the problem is more acute. While these resources are more geographically limited than wind, they function as dispatchable, base load resources, enhancing their value. Drilling new geothermal wells or upgrading existing hydro facilities to create incremental power expansions is highly capital intensive. The vast majority of these projects cannot be completed within the short placed-in-service time frames under the existing PTC legislation, thus severely limiting new investments.⁵

Consider the work underway by Davenport Power LLC to develop what could be the first major geothermal power plant in Oregon. The cascade region of Oregon and Washington appears to have substantial untapped geothermal resources, and development of the first power projects in the region would have added significance. But, according to Todd Jaffe of Davenport, despite the fact that the company intends to begin drilling and on-site development this month, without an extension of the PTC the project may fail.

As Mr. Jaffe of Davenport Power explains:

This project (120MW) will cost in excess of \$400 million. NGC is working with its investment banker in order to secure the necessary long term equity required for the project. This commitment is needed as soon as possible since the majority of the well drilling must be financed with equity. In order for this project to be economically successful, the project MUST receive the PTCs. Our investors are assuming that Congress will once again extend the PTCs to cover the in-service dates thought 2011 and that the project will receive these credits for the entire 10 years.

⁴Testimony of Vince Signorotti, Vice President, CalEnergy Operating Corporation, House Ways and Means Subcommittee on Select Revenue Measures, May 24, 2005.

⁵Testimony of Todd M. Raba, President, MidAmerican Energy Company, Before the Committee on Finance, United States Senate, March 29, 2007.

If not, NGC will not be able to secure equity funding and the project may have to terminate.⁶

In the 1980s, the combination of federal tax credits and power sales contracts issued under the Public Utilities Regulatory Policies Act of 1978 (PURPA), fueled dramatic growth in renewable power, including geothermal energy. By the early 90s federal tax credits had been eliminated or scaled back, energy prices dropped to historic lows, and PURPA contracts ceased. EPAct has again made the development of geothermal projects possible, again. However, the long lead times of geothermal projects and the short term of the credit period are undercutting its potential.

We urge the Subcommittee to support extending the credit and amending Section 45 to allow geothermal and other baseload power plants to qualify for the credit once they have secured binding contracts and are under construction.

Exploration Incentives

As the examples above note, the early expenses of geothermal projects are particularly difficult hurdles. Exploration is usually financed with equity, carries high risks, and takes a long time to be paid back. The exploration technologies available today do not allow confirmation of the resource without drilling, and drilling geothermal wells is expensive, with costs ranging from a few million to over ten million dollars for a single well. There are substantial undiscovered geothermal resources in the U.S., but a dramatic increase in new exploratory drilling will be necessary if potential resources are to be developed into power projects.

While the PTC helps provide incentives for power projects, it is not as effective at encouraging exploration. Early exploration can take place a decade before any power will be produced, and can often involve an investor who is not the power developer. The cost and risk of exploration for new geothermal resources is as high or higher than those in the oil and gas industry, and the ability to attract capital to finance geothermal exploration is far more difficult.

Providing incentives for exploration is an important part of ensuring a continued cue of new projects. We urge the Subcommittee to consider enacting a tax credit for 30% of the costs of exploratory drilling.

The Critical Role of Tax Incentives

Tax incentives are critical to offset the high initial cost and risk of developing new geothermal power projects. The California Energy Commission (CEC) estimated that the initial capital cost of a typical geothermal facility was roughly \$2700 per kilowatt, which is 4–6 times greater than the capital cost of a comparable-output combined cycle natural gas power plant as shown in the following table.

Table 1: Capital Costs of Natural Gas and Geothermal Facilities
(CEC estimates 2003)

Capital Costs	Installed Costs		In-service Cost
Combined Cycle Natural Gas	542	592	616
Geothermal Flash	2128	2410	2558
Geothermal Binary	3210	3618	3839

Source: Comparative Cost of California Central Station Electricity Generation Options, Magdy Badr and Richard Benjamin, California Energy Commission, 2003.

The CEC estimate does not reflect recent increases in steel and drilling costs discussed later in this statement, and does not include “site specific” costs such as permitting and transmission. Capitol costs of new plants have been increasing substantially, as the following chart from EnergyBiz Magazine shows:

⁶Personal Communication, Todd Jaffe, Davenport Power LLC, March 15, 2007.

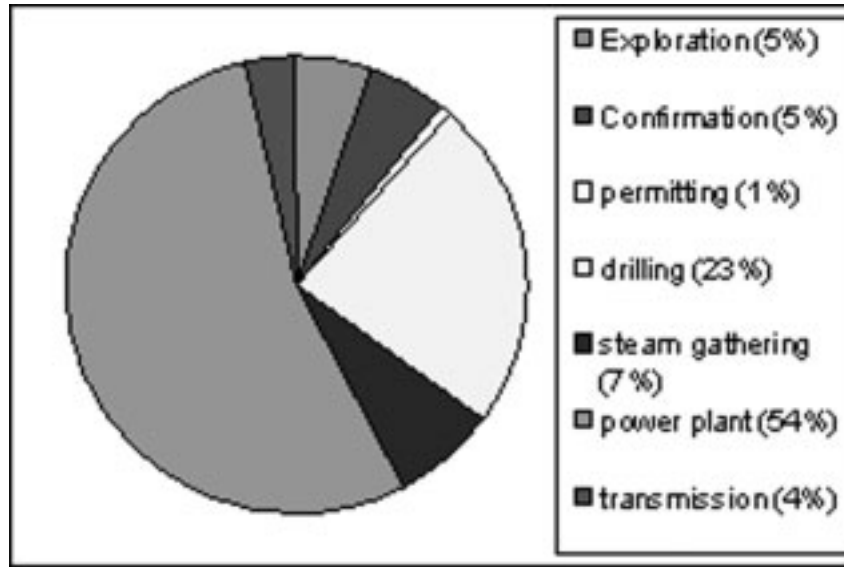
Table 2: Power Plant Capitol Cost Inflation

2005-2006 Cost Inflation on Select Power Plant Equipment and Materials		
Power Plant Equipment/Material	2005 Escalation	2006 Escalation Trend
Portland and other cement	12.52%	14.61%
Steel Tanks	13.64%	9.45%
Fabricated Structural Steel	7.27%	7.28%
Fabricated Iron & Steel Pipes and Tubes	10.38%	6.53%

Because a geothermal facility has very low fuel costs and no fuel market volatility, in the long run, over 30–50 years, the “levelized” cost of a facility might be competitive with the long-term costs of a fossil fuel plant (considering both capital and fuel costs). But without the Section 45 Production Tax Credit (PTC), the initial risks, long lead times, and high capital cost will compel many investors to choose other alternatives that have shorter lead times, less risk, and lower front-end costs.

In an important way, the PTC is equalizing risk. Given the high capital cost and risk associated with geothermal development, the PTC gives the investor the incentive necessary to consider geothermal energy on a more equal basis with conventional power projects. In addition, by lowering the capital risk for the geothermal projects, the ratepayer and the economy benefit by avoiding price spikes and instead ensuring long-term stable prices for energy.

Also, as the Figure below indicates, only about half of the investment needed for a new geothermal facility qualifies for the Investment Tax Credit, making a 10% credit effectively a 5% credit, while an output-based credit like the PTC makes no such distinction.

Figure 1: Typical Cost Breakdown of Geothermal Power Projects⁷

Comparative Taxation Rates

Geothermal facilities pay significant federal, state and local taxes. A study conducted for the Department of Energy in 1998 by the Princeton Economic Research Inc states:

"A lot more Federal income tax is being collected from geothermal electricity than from electricity produced from natural gas, on a per kWh basis. It appears that geothermal power systems, while having been granted a number of Federal tax incentives, . . . nevertheless appear to bear much heavier Federal income tax loads than are borne by some natural gas power generating systems. This is mostly because geothermal systems are much more capital intensive than natural gas power systems, and profits and income taxes are generally proportional to the size of investments."⁸

More recent analysis supports this conclusion. Brandon Owens, who went on to become Associate Director at Cambridge Energy Research Associates, published a study entitled "Does the PTC Work?" which found: "Fossil fuel—fired technologies have a lower tax burden relative to all renewable power technologies. The difference in tax burden is most pronounced for biomass and geothermal technologies, which, in this example, pay 227 percent and 338 percent more in total taxes, respectively, than they do for gas-fired combined-cycle units on a per megawatt-hour (MWhr) basis."⁹

As Vince Signorotti pointed out in his 2005 testimony:

Providing the geothermal industry with a production tax credit does not get us off the hook on the tax front by any means. Indeed, one recent study has shown that geothermal plants pay, on average, more than three times the taxes that gas-fired combined cycle power plants pay on a per megawatt-hour basis.¹⁰ This is largely the result of geothermal's high capital and related infrastructure costs and the fact that a much higher percentage of our costs go to labor than a comparably sized gas plant, whose highest cost item is fuel.¹¹ In fact, our pro formas show that over

⁷ Factors Affecting Costs of Geothermal Power Development, Cedric Nathanael Hance, August 2005, available at: <http://www.geo-energy.org/publications/reports.asp>.

⁸ Entingh, Daniel J. (December 15, 1998). "Review of Federal Geothermal Royalties and Taxes." Princeton Economic Research, Inc., page 4.

⁹ Owens, Brandon (July 2004). "Does the PTC Work?" PR&C Renewable Power Service, page 9.

¹⁰ "Does the PTC Work?," by Brandon Owens (PR&C Renewable power Service, July 2004), pp. 10–12.

gas plant, whose highest cost item is fuel.¹¹ In fact, our pro formas show that over the next 30 years, even with the benefits of the production tax credit in place, Salton Sea Unit 6 will still pay \$100 million in federal income and payroll taxes and nearly \$200 million in state and local income, property, and payroll taxes.

Accounting for the Positive Values of Geothermal Energy

Today, perhaps more than ever before, Americans are aware of the costs of our energy habits. The national security implications of our dependence on foreign sources of energy are clear.

Even more foreboding are the increasingly dire warnings about the consequences of global climate change. While the health costs of air and water pollution drove Congress to enact landmark air and water quality laws, more action is needed by Congress to intervene in energy markets with legislation that addresses greenhouse gas emissions.

Geothermal energy is a domestic resource. Because geothermal power plants do not burn fuel like fossil fuelplants, they release virtually no air emissions. In general, geothermal energy production results in minimal environmental impacts, which are detailed in *A Guide to Geothermal Energy and the Environment* available at: <http://www.geo-energy.org/publications/reports.asp>. But, the marketplace price of energy does not reflect any of these values.¹²

Providing tax incentives for new production is one effective way of compensating for the marketplace's failure to include such externalities in energy prices.

The Western Governors' Clean Energy Initiative

As Congress considers its next steps after EPAct, we call to the Committee's attention the recent recommendations from the Western Governors' Association (WGA) Clean and Diversified Energy Advisory Committee (CDEAC), and specifically the CDEAC Geothermal Task Force Report and recommendations. The CDEAC effort is unquestionably the most systematic, thorough, and contemporary examination available of the potential for geothermal energy and other clean energy technologies to contribute to the energy needs of the West. The CDEAC effort concluded that clean technologies can meet or exceed the West's need for new energy sources, but that sustained federal and state support is needed to achieve this goal.

The CDEAC Geothermal Task Force made the following specific recommendation:

Geothermal Priority Recommendations

1. Federal and state tax credits are important to reduce the risk and high capital cost of new projects. The federal production tax credit (and clean renewable bonding authority) should be made permanent, or at least extended ten years.

Such changes would make the PTC an effective and equitable stimulus for new investment in geothermal power and result in substantial economic, energy security, and environmental benefits.

Conclusion

The production tax credit is helping to spur renewed geothermal energy development, but much more is possible. We urge Congress to take the next steps and enact a long-term extension of the production tax credit, modify placed in service treatment for baseload power plants, and provide an incentive for new geothermal exploration. Together, these measures would help unleash the potential of this renewable energy resource.

¹¹One study has shown that "job creation from geothermal energy is 11 times higher than from natural gas." "Renewables Work: Job Growth from Renewable Energy Development in California," by Brad Heavner and Susannah Churchill, June 2002 (<http://www.calpirg.org/reports/renewableswork.pdf>).

¹²One assessment of the marketplace value of the environmental externalities of geothermal energy production concluded that geothermal power production prevents emissions of 32 thousand tons of NO_x, 78 thousand tons of SO₂, and 16 million tons of CO₂ per year, which were worth \$243.7 million in equivalent air emissions value, or roughly 1.6 cents/kWhr of geothermal electricity produced. "Promoting Geothermal Energy: Air Emissions Comparison and externality Analysis," Alyssa Kagel and Karl Gawell, *The Electricity Journal*, August/September 2005, Vol. 18, Issue 7.

Table 3: Developing Geothermal Projects by State and Status (November 2006) *

State	Unconfirmed	PHASE 1 (Identifying site, secured rights to resource, initial exploration drilling)	PHASE 2 (Exploratory Drilling and confirming)	PHASE 3 (Securing PPA and final permits)	PHASE 4 (Production Drilling and Under Construction)	TOTAL* (PHASE 1 to PHASE 4)
Number of sites and MW-range "# of sites/MW"						
AK	1/15 MW	1/20 MW			1/0.6 MW	2/20.6 MW
AZ		1/2–20 MW				1/2–20 MW
CA		5/320–330 MW	3/326.8 MW	5/139.5 MW	2/35–73 MW	15/821.3–869.3 MW
HI		1/30 MW		1/8 MW		2/38 MW
ID	2/200 MW		1/26		1/10 MW	2/36 MW
NM			2/21 MW			2/21 MW
NV	5/72–102 MW	7/304–393 MW	3/49–64 MW	6/157–167 MW	3/37 MW	19/547–661 MW
OR		3/86–91 MW	1/40–60	2/60.2 MW		6/186.2–211.2 MW
UT	2/135 MW		1/36.6 MW		1/11 MW	2/47.6 MW
Total	10 projects 422–452 MW	18 projects 762–884 MW	11 projects 499.4–534.4 MW	14 projects 364.7–374.7 MW	8 projects 93.6–131.6 MW	51 projects 1719.7–1924.7 MW

*Unconfirmed projects are not counted in the state or final total.

Total U.S. Geothermal Projects Identified as Under Development—Confirmed and Unconfirmed—11/10/2006
61 Projects 2,141.7 MW–2,376.7 MW

Chairman NEAL. Thank you.
 Mr. Resch.

STATEMENT OF RHONE RESCH, PRESIDENT, SOLAR ENERGY INDUSTRIES ASSOCIATION

Mr. RESCH. Thank you, Mr. Chairman and Members of the Committee, for providing the opportunity to testify today. My name is Rhone Resch, and I am president of the Solar Energy Industries Association, a national organization that represents close to 500 companies and over 20,000 employees in the U.S. solar energy industry.

My testimony today is especially timely. Just two days ago I filled out my taxes with TurboTax. And for the first time in 23 years, there was a box on the form allowing taxpayers to receive a tax credit for installing a solar system. I'm happy to say that I did install a system in 2006, and I did check that box and got that credit. And I want to personally relate the sense of patriotism and individual energy independence that I felt upon installing a solar system right here, in Washington, D.C.

This system provides 100 percent of the electricity that my family will use over the course of the year. This is carbon-smart, pollution-free energy, and it works right here, in Washington, D.C. In fact, this is an example of the solar panels that we put on my house. It's by a company called Sun Power, a U.S. company. It's the most efficient panel made in America. You can see it looks like a flat screen TV. Very different from what most people think solar panels look like.

So, while Jaime brought his beer, I'm happy to say I brought my power plant. And if I had been smart, I would have brought 20 bottles of the wines that are made by the solar wineries in Congressman Thompson's district. But that will be for another hearing.

So, from this experience I have some brief and concrete suggestions for ways to improve the current investment tax credit for solar energy. I am happy to say that the basic structure of an investment tax credit does work for solar. However, the duration of the credit is too short, and the scale is too small to encourage investment in U.S. manufacturing, or the construction of new solar power plants.

Therefore, the most important thing that this Committee and Congress can do to improve upon the current solar tax credit is to pass H.R. 550, Securing America's Energy Independence Act. H.R. 550, introduced by Congressman McNulty and Congressman Camp, with 54 cosponsors, provides an 8-year extension of the ITC for both residential and commercial solar and fuel cell systems, and will send a long-term market demand signal that is needed for our industry to grow. H.R. 550 also improves the current ITC by modifying the structure for photovoltaics, to increase efficiency and drive down costs.

The rest of my testimony will focus on why we need an 8-year extension. The first is with respect to competitiveness. The development and manufacturing of solar energy is the fastest growing segment of the high-tech industry. Almost all of the growth is occurring in Japan, Germany, and China.

Once again, technology developed in the United States is being commercialized by other countries. Just 7 years ago, the U.S. manufactured 40 percent of the world's solar electric goods. In 2006, we slipped to less than 7 percent of total growth production.

In contrast, four years ago China had no solar manufacturing, and today produces 15 percent of all world supply. The lesson here is clear. The U.S. is once again getting beat out by Germany, China, and Japan, who have jump-started their industries with long-term Federal incentives that create domestic markets and encourage consumers to buy solar energy.

In contrast to Japan's 12-year incentive and Germany's 20-year program, the ITC in the United States is for just two years. The only way that the U.S. can reclaim global leadership in solar and spur growth in domestic manufacturing is through the adoption of an 8-year extension of the ITC.

Second, we need an 8-year extension to move us toward energy independence. Expanding the use of solar energy can dramatically reduce a reliance on foreign sources of energy. All solar technologies—PV, solar water heaters, and utility scale power plants—displace natural gas. But all technologies need a long lead time to scale up.

Utility scale power plants can be built to provide firm, dispatchable power to the fastest growing communities in the United States. These power plants directly displace expensive polluting and inefficient natural gas peaking plants, and can decrease our growing demand for natural gas from the Middle East and Algeria.

The problem, like that of nuclear and coal fire power plants, is that the construction of utility scale power plants takes five to seven years, from the planning to startup. And because of this lengthy construction time, a short-term extension for solar on the ITC will provide absolutely no incentive to build these plants. So, if we want to get serious about energy independence and security in a carbon-smart way, then the ITC must be extended for eight years.

The third justification for why we need an 8-year extension is to establish parity between solar and other energy technologies. And parity, here, constitutes equal treatment, not special treatment.

So, for instance, in the Energy Policy Act of 2005, clean coal technologies were granted favorable tax treatment for ten years. New generation nuclear technologies were provided eight years. And as Jaime pointed out, even in the production tax credit, section 45, when that was originally created, it had an eight-year initial window.

These long-term policies were an explicit recognition of the fact that emerging technologies need financial, regulatory, and market certainty that can only be afforded by long-term, consistent Federal tax policies. Solar energy should be afforded equal treatment.

Therefore, it is critical that the extension of the solar ITC be for eight years, as provided in H.R. 550.

Finally, I would like to point out that solar energy is our Nation's most abundant energy resource, surpassing coal, gas, and oil reserves, combined. The United States has, simply put, the best solar resources of any developed country in the world. However, in 2006, solar energy produced just 1/30th of 1 percent of all the electricity in the United States—1/30th of 1 percent, yet we've got the best solar resources in the world.

Take a look at this map. This shows a map of Germany and the solar insulation there, and the solar insulation in the United States. You can see the difference. Germany, which has the solar equivalent of Anchorage, Alaska last year installed seven times more solar than we did in the entire United States.

So, given its abundance, solar energy is an obvious choice for a clean, reliable, and domestic energy future. Greater reliance on this untapped energy resource will grow our economy, create jobs, increase security and integrity, while heralding independence.

Passing H.R. 550, the Securing America's Energy Independence Act, is the most meaningful solar policy that Congress could enact. I thank the Committee for giving me this opportunity to speak, and I am available to answer questions that you may have.

[The prepared statement of Mr. Rhone Resch follows:]

Statement of Rhone Resch, President, Solar Energy Industries Association

Thank you, Mr. Chairman and Members of the Committee, for providing me the opportunity to testify today.

On behalf of almost 500 companies and more than 20,000 employees in the U.S. solar energy industry, I urge the Committee to extend and improve the investment tax credit (ITC) for solar energy property for eight years, as provided in the *Securing America's Energy Independence Act*, H.R. 550.

I would like to focus my testimony on several key points:

An eight-year extension of the solar ITC is crucial to establish parity between congressional support for other electricity generation technologies and solar energy. Parity constitutes equal treatment—not special treatment;

- An eight-year extension of the ITC will create significant benefits that are not possible through more frequent, shorter term extensions of favorable tax treatment;
- The credit needs to be improved to increase market efficiency and drive down costs. Converting it from a cost-based to capacity-based credit will reward greater energy production, not greater costs; and finally,
- Solar energy improves our energy independence, energy security and environment, and it deserves long-term, stable congressional support now.

Before addressing the key points above, a couple of contextual points are in order.

Recent Solar Tax Treatment History and Current Legislation

The Energy Policy Act of 2005 (EPAct 05) created a new commercial and residential ITC for fuel cells and solar energy systems placed in service from January 1, 2006 through December 31, 2007. The credit was further extended for one additional year in the Tax Relief and Health Care Act of 2006. The solar ITC now expires on December 31, 2008.

The new solar ITC is working and has helped more Americans use solar energy in their homes and businesses. However, the credit's limited size and duration has restricted manufacturing investment, failed to significantly increase the number of trained installers, which are critical to drive down future costs, and has not resulted in the construction of new utility-scale solar power plants. In response, Congressmen Michael McNulty (D-NY) and David Camp (R-MI) have introduced the *Securing America's Energy Independence Act* (HR 550) to improve and build upon the existing tax incentive.

The *Securing America's Energy Independence Act* provides a blueprint of the policy changes needed to secure a long-term robust solar marketplace in America. Specifically, the legislation:

- Extends the ITC for all residential and commercial solar and fuel cell equipment for eight additional years;
- Modifies the residential and commercial tax credit for photovoltaic cell technology (direct conversion of sunlight into electricity) to \$1,500 per half kilowatt;
- Removes the 30% cap for commercial photovoltaic installations and the \$2,000 cap on residential photovoltaic installations;
- Provides alternative minimum tax (AMT) relief; and, Provides three year accelerated depreciation for commercial projects.

The short and long-term benefits of enacting these changes would be significant. The benefits include:

- **Increased energy security:** Solar technologies help stabilize the nation's electricity grid, provide clean, reliable power, and reduce the impact of natural disasters and terrorist acts. Producing these home-grown technologies in the U.S. will reduce our dependence on foreign sources of energy, while simultaneously lowering the cost of energy to consumers.
- **Reduction in the use of high cost natural gas:** In most parts of the U.S., peak electricity demand occurs when solar electricity is near optimal efficiency (9 AM—6 PM). This demand load is almost exclusively served by central station gas generation that can be easily cycled on and off and is often highly inefficient. An eight-year extension of the ITC will displace over 5.5 trillion cubic feet (Tcf) of natural gas and save consumers over \$50 billion.
- **Job creation:** Solar systems require high-tech manufacturing facilities and produce well paying, high-quality jobs. Extending the tax credit will create an estimated 55,000 new jobs in the solar industry and over \$45 billion in economic investment.
- **Clean energy:** Solar energy is the cleanest of all renewable energy sources, producing electric and thermal energy with zero emissions, no waste products or other forms of pollution.¹

The Crucial Nature of the Eight-year Extension

It is critical that the extension of the ITC be for at least eight years, as provided for in HR 550. An eight-year extension will provide the long-term market “demand-signal” that is needed for industry to build new manufacturing capacity, expand the installer workforce, and construct new utility-scale solar power plants.

Similar to other emerging energy technologies such as clean coal and new generation nuclear, utility-scale concentrating solar power (CSP) plants and new solar cell manufacturing plants require long lead times that far exceed the two-year time period remaining under EPAct 05 and the Tax Relief and Health Care Act of 2006. Development of a CSP plant can take six years, while new photovoltaic cell manufacturing facilities often require four years to be completed.

Additionally, solar energy is unique from other renewable technologies because it is installed on rooftops and requires an entire workforce of skilled electrical workers, plumbers, roofers, and others to be trained and certified to install solar systems. The creation of an entirely new specialized workforce requires substantial time and expenditure by the industry that will not occur without a long-term extension and improvement of the tax credit.

Long-term regulatory and tax treatment certainty is equally important to project financing. Solar energy power plant projects are more complex than conventional power plants because of the unfamiliarity of the lending industry with the technology. On average, financing can take an additional 12 months for project development. Political and therefore market certainty—in the form of an eight-year ITC—is needed to help reduce the cost of capital for these projects.

Despite the unique needs of the solar energy industry for long-term certainty, concerns have been raised that federal budget constraints may prevent long-term extension of the solar ITC. Similarly, some have argued that all renewable technologies, without regard to past treatment or current differences, should receive the same length of tax credit extension.

According to this argument, some maintain that it would be unfair to provide solar technologies with a longer duration credit extension than that accorded to other electricity generation technologies. This concern misses the mark. An eight-

¹ For a comprehensive description of the three commercial solar technologies see appendix

year credit extension for solar would approximate equal treatment and does not equate to special treatment. This is so for several reasons.

First, in EPAct 05 clean coal technologies were granted favorable tax treatment for ten years and new generation nuclear technologies were provided eight years. Wind energy technologies were also initially granted an eight-year duration (1992–2000) when the Internal Revenue Code § 45 production tax credit (PTC) was created. These long-term extensions were an explicit recognition of the fact that emerging technologies need financial, regulatory and market certainty that is only afforded by long-term, consistent federal tax credit policy. Solar energy should be afforded equal treatment.

Secondly, energy technologies with more mature markets are governed by the production tax credit (PTC) provisions in Code § 45 (e.g. wind, geothermal, hydropower), while renewable technologies with less developed markets (e.g. solar and fuel cells) are governed by the ITC provisions in Code § 48 (commercial) and § 25 (residential). Due to these differences in market maturity, it is even more critical to provide long-term incentives to the ITC technologies. Long-term support will encourage market expansion to the level enjoyed by the PTC technologies.

It is also important to recognize that the PTC and the ITC mechanisms function in fundamentally different ways and should not be viewed identically. As a practical matter, a one-year extension of the PTC is tantamount to a ten-year extension of the ITC. For instance, if the § 45 PTC is renewed for one year, the duration of the favorable tax treatment is actually 10 years. This is because the “one year extension” for the § 45 PTC actually refers to the duration of the “placed-in-service” rule governing the credit, not the actual temporal duration of the credit’s availability. Accordingly, under a one year § 45 PTC extension, a claimant has one year to place qualifying § 45 property (e.g. geothermal, hydro, wind, etc.) “in-service” to trigger an annual, recurring tax credit that lasts for ten years.

In contrast, the § 48 ITC (or alternatively the § 25 ITC) is a one-time credit for a portion of the cost of installing a qualifying solar system. The “claiming” of the § 48 ITC credit *does not* trigger annual tax credit eligibility in each of the succeeding ten years. This distinction in the practical operation of the two different credits is fundamental. Furthermore, financial markets place a special premium on long-duration favorable tax treatment.

To the extent that the metric of Congressional fairness to varying technologies is tax extensions of equal duration, then the differences in the mechanics of the § 45 PTC and the § 48 ITC cannot be overlooked. To do so would fundamentally disadvantage solar energy technologies vis-&-vis competing electricity generation technologies. There is no sound public policy rationale for this lesser and disparate treatment.

The conclusion then, is clear. The ITC for solar energy and fuel cell assets should be extended for eight-years without regard to the length of extensions that are accorded other renewable energy assets. This is especially so given the history of favorable tax treatment that has already been afforded to coal, nuclear, ethanol, wind and other technologies.

An Eight-Year Extension of the Solar ITC Creates Unique Benefits

The value of an eight-year extension of the solar ITC cannot be equated with more frequent credit renewals of lesser duration. Four successive extensions of two-year durations each will not allow the U.S. to construct new utility-scale CSP plants, reinvigorate our solar manufacturing base and pave the way for significant expansion and work-force training in the solar system design and installation industry. Only through a single, eight-year extension can the U.S. solar energy industry realize its full potential. Nothing better illustrates this point than the graph below in Figure 1.

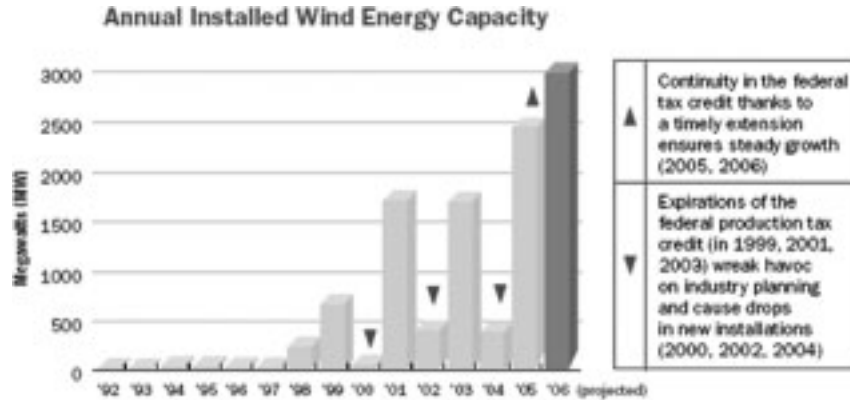


Figure 1: Source: AWEA, Wind Power Outlook 2006

As the chart in Figure 1 demonstrates, short duration, frequent renewals of credit extensions create a “boom-and-bust” cycle that will not favor the longer term development of a robust, national solar energy industry that maximizes the potential of our world-class solar resources.

Accordingly, it is essential that the extension of the ITC be for at least eight years. Such an extension will provide the long-term market demand signal that solar energy needs to transition from a nascent market to a mature one. Congress must eliminate the stop-start incentive cycle and create market conditions that allow solar companies to make new long-term investments that will reduce costs. To date, Congress has provided two short-term extensions (two and one year, respectively) that have not provided sufficient policy certainty for businesses to make long-term decisions.

An eight-year extension is especially critical for the development of large, utility scale (e.g. 500 megawatts) solar power plants. CSP plants (also referred to as solar thermal electric power plants) are large projects that often take six years to complete from the initial planning stages. In this regard, CSP plants face many of the same challenges that other, state-of-the-art power plant designs such as new-generation nuclear plants and “clean coal” power plants confront. In fact, Congress in EPAct 05 recognized the unique challenges facing “clean coal” and new nuclear power plants when it provided ten-year and eight-year duration favorable tax credit authorizations for these technologies, respectively. Congress should accord CSP plants similar treatment.

An eight-year extension is also crucial to reinvigorating the U.S. solar manufacturing base. Because of the capital intensive nature of solar energy hardware production, new U.S. manufacturing facilities will not be constructed unless there is business and investor confidence that the U.S. marketplace will experience a long, steady and robust demand cycle for solar energy products. This need for a strong “demand signal” to spur domestic manufacturing applies equally to the solar thermal (water heating), the CSP, and the photovoltaic segments of the U.S. solar manufacturing base. This point also applies with equal vigor to the entire “solar value chain” that includes research, engineering, polysilicon manufacturing, plastics manufacturing, glass production, copper wire drawing, metal fabrication, instrument manufacturing and battery production, among others.

Finally, an eight-year “demand-signal” is also necessary if the U.S. is going to grow the installer base necessary to sustain robust deployment of solar technology. In order to expand the domestic market for solar energy, a significant number of electricians, plumbers, roofers and designers need to be trained and certified. Yet solar design and installation firms are unable to hire new personnel and bear the expense of training unless it is clear that the U.S. solar market is in a period of long-term sustained activity and growth. Passage of HR 550 will provide the long-term financial, regulatory and business certainty that business owners require to commit significant new capital for workforce training and expansion.

Improvement of the Existing ITC will Maximize Efficiency and cost Reductions

Passage of the *Securing America's Energy Independence Act*, HR 550, will improve the current structure of the credit for photovoltaic (PV) (for more information see

appendix) installations from 30% of the cost of the installed system to \$1,500/half kilowatt, based on the nameplate capacity of the system. This modification would mimic the current structure for fuel cells. This change improves the credit by converting it from a cost-basis to a capacity-basis, thereby rewarding greater capacity, not greater costs.

There are several reasons for the PV credit to be modified to a capacity-based incentive. First, capacity-based incentives encourage cost efficiency and expedite the reduction of the cost of solar energy. In comparison, a cost-based incentive could discourage true cost reductions until a mature, highly competitive market is developed.

Second, a capacity-based incentive rewards new technology that can produce electricity at a lower cost. For example, in Washington DC, the “turn-key” cost for an installed PV system is approximately 6,000/half-kilowatt. If enacted, the improved credit structure in HR 550 would subsidize approximately 25% of the cost of the system. As the market matures and less expensive technologies are deployed, in the form of low cost panels or more cost effective installation technologies, it is anticipated that the installed cost would drop to approximately \$4,000/half-kilowatt. The improved credit would then represent 35% of the cost of a system. Cost reductions in technology and installation will then encourage greater numbers of installations, further driving down system costs.

Finally, studies have shown that state programs that incentivize solar technology deployment using a capacity-based rebate program result in larger solar installations than state programs that use a straight cost-based structure. This is especially important when we consider how solar can reduce demand for natural gas fired peak power (the most expensive electricity) and bring lower energy costs to all consumers. Larger initial installations have unique benefits, such as grid stability, avoided consumption of high-priced natural gas, myriad environmental benefits, and job creation throughout the entire economy.

The Energy Security, Energy Independence and Environmental Benefits of Solar

Enactment of HR 550 will improve our energy security, move the U.S. closer toward energy independence, and deliver numerous environmental benefits due to the inherent non-polluting nature of solar energy.

Energy Security

As Congress looks to increase the use of carbon-smart renewable energy, it is critical that priority be placed on technologies that also improve U.S. energy security. Solar energy, in all of its forms, is a technology that can greatly improve the U.S.’s ability to have a secure and reliable energy supply.

The electricity infrastructure in the U.S. is aging and energy consumers are increasingly subject to outages that affect critical infrastructure and disrupt business. The black out of August 2003 in the Northeast, triggered by a tree limb landing on power lines, cost consumers and businesses tens of billions of dollars. Unfortunately, this event is not unique and will occur with greater frequency if Congress does not take steps to diversify our energy portfolio.

The good news is that this event could easily have been avoided through greater use of solar energy. A 2004 Department of Energy (DOE) study entitled *Solution to the Summer Blackouts?* concludes that if solar energy had met just one percent (1%) of local peak demand, we would have avoided the August 2003 blackout and other local brownouts. DOE’s explanation was simple: high air conditioning loads stressed the grid and caused the blackout. These loads occurred on the hottest and sunniest days during the summer—the exact time when output from solar systems are greatest. DOE also concluded that over reliance on central generating stations led to grid fatigue and failure. This infrastructure vulnerability could have been minimized through greater reliance on distributed solar energy.

Photovoltaic (PV) and solar water heating systems are distributed generation (DG) technologies. Like other DG technologies, they provide energy at the point of consumption rather than at a central power plant hundreds of miles away. As such, DG does not rely on vulnerable regional transmission lines and local distribution networks. By producing energy at the source of consumption, solar power alleviates stress and vulnerability on the grid.

The DOE study also concluded that investing in solar energy is a more economically efficient and cost effective way to improve our energy infrastructure than capital intensive and often community-opposed transmission line upgrades. In sum, using solar energy is a cost-effective, affordable way to alleviate stress on the electricity grid and improve the overall reliability of our electricity infrastructure.

Solar is also the most reliable source of energy. This reliable track record has resulted in wide deployment of the technology in applications where power interrup-

tions are unacceptable, including: oil and gas industry use of solar energy to power pumps and meters at remote locations; telecommunications industry use of solar to power relay stations and remote equipment; and, every satellite that has been sent out into space in the last 30 years has been powered by solar energy.

Ironically, energy industry acceptance of the technology stands in stark contrast to consumer behavior. Consumers are investing hundreds of millions of dollars in small gasoline-powered generators. During grid failure and electricity outages, electronic gasoline pumps at the gas stations do not operate, rendering many generators idle because of fuel shortage. Solar energy is a technology that can provide reliable power during power outages.

Finally, solar stabilizes volatile energy prices, a critical energy security issue affecting the U.S. today. In the last five years, consumers have seen electricity prices escalate between 20 and 78 percent. At the same time, we have seen the price of natural gas triple and the price of gasoline routinely exceed \$3.00 per gallon. Each year the cost of energy is taking a larger percentage of a family's income than at any other time in U.S. history. This energy inflation vulnerability especially impacts the poor and elderly on fixed incomes.

Solar can help address this vulnerability because it requires no fuel to operate. Although a solar system is more expensive up front, there are no additional costs for operating a system once installed. Furthermore, solar panels are guaranteed for 20–25 years, allowing consumers to “lock in” their electricity prices for decades. Recognizing the upward trend in energy costs, incentivizing the use of a technology that requires no fuel inputs is an important element of any energy security plan.

Energy Independence

Solar energy is a domestic and abundant energy source in the U.S. The U.S. has the best solar resources of any developed country in the world. Proportionally, U.S. solar energy resources exceed those of fossil, nuclear or other renewable energy resources. Despite this tremendous advantage, the U.S. has failed to capture and harness this free and readily available energy. In 2006, solar energy produced just 1/30th of one percent of all electricity in the U.S.; Germany in contrast, with the solar resources of Alaska, installed seven times more solar energy property than the entire U.S.²

Congressional determination to increase energy independence hinges upon its commitment to developing our unlimited domestic solar resources. To accomplish this, Congress must pass an eight year ITC extension, such as that found in HR 550.



Figure 2: Germany Insolation

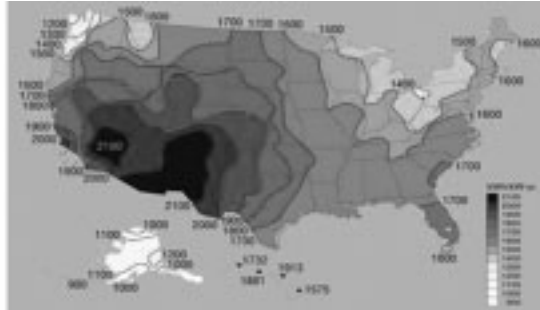


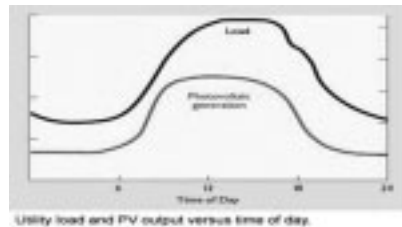
Figure 3: U.S. Insolation

The U.S. is over-dependent on foreign sources of energy. Demand for natural gas continues to rise, primarily for the electricity generation. Increasingly we are turning to countries like Algeria to provide us with liquefied natural gas (LNG) to meet our growing demand. According to the Federal Energy Regulatory Commission, 41 new LNG terminals are proposed for construction in U.S. harbors and off U.S. beaches. Constructing these plants will exacerbate our addiction to foreign sources of energy. Our desire for energy independence demands a different course.

Solar energy directly displaces natural gas used for heating homes and water. In a home, solar can directly replace natural gas used to heat radiant systems and can displace up to 70% of the natural gas used to generate hot water. Many countries

⁶⁸ Energy Information Administration, Net Generation by Energy Source by Type of Producer, October 2006.

that do not have a domestic source of fossil fuels, including Spain and Israel, mandate that all new homes must have solar water heating systems installed. The U.S. can demonstrate similar energy independence by using market incentives that spur solar investment and market growth.



Solar energy also displaces natural gas used to generate electricity. Almost all intermediate and peaking electricity plants use natural gas as the source of energy. These plants are often very inefficient and produce expensive electricity. Solar energy, which generates electricity from 8 A.M.–7 P.M. daily, can displace these inefficient, high cost power plants, and become a reliable source of firm, dispatchable power.

Given the high price of natural gas to key industrial sectors and consumers, the U.S. can no longer afford to neglect its abundant solar resources. Analysis conducted by the Solar Energy Industries Association concludes that an eight-year extension and expansion of \$48 and 25 tax credits for solar energy will displace over 5.5 trillion cubic feet (Tcf) of natural gas, providing an economic value to consumers in excess of \$50 billion.³ This is enough energy to displace the need for all new LNG terminals by 2012.

In addition to tempering natural gas demand growth, solar can also generate electricity to be used by plug-in hybrids and electric vehicles, thereby displacing gasoline derived from foreign oil supplies. Imagine a gasoline-free electric vehicle that also uses electricity derived from the sun rather than a coal-fired plant. The technology is advancing rapidly in this direction, but it is critical that Congress catalyze the market by providing incentives to use solar energy.

Environmental Benefits

Though the environmental benefits of solar energy might be considered a given, it is worth highlighting several points. Solar is the cleanest method of energy generation, in terms of avoided air, waste and noise pollution, energy payback, water conservation, radiation, harm to wildlife, or environmental risk in the event of an accident.

Solar energy produces no greenhouse gases, no acid precipitation or toxic emissions, and no other air pollution of any kind. Over the 40–50 year life of a solar electric system, every kilowatt (kW) of solar electric power reduces 217,000 pounds of carbon dioxide, 1500 pounds of sulfur dioxide, and 830 pounds of nitrogen oxides emissions as compared to electricity produced by conventional generation.⁴

Photovoltaic solar energy generates electricity without use any water. In contrast, fossil fuel and nuclear based electricity generation use substantial amounts of water to run steam turbines. Across the U.S., approximately 40% of fresh water withdrawals are used for electric generation.⁵ If water-starved communities like Phoenix and Las Vegas are to continue growing, we must place greater emphasis on water-free electricity generating technologies.

Concerns have been raised whether the energy used to produce solar panels is surpassed by the amount of energy generated from the panels. This energy relationship is referred to as the “energy payback period.” Currently, the energy payback for PV panels varies from 1–4 years depending on different manufacturing variables. This means that a PV panel with a life expectancy of 40–50 years will generate between 10 and 50 times more energy than was required to create the panel. Despite this superior “energy return on investment”, the manufacturing process is still growing more efficient every year as the scale of production increases.⁶

Conclusions

Solar energy is an obvious choice for a carbon-smart, reliable and domestic energy future. Greater reliance on this untapped energy resource will grow the economy, create jobs, increase grid integrity and security, while heralding energy independence. Unfortunately, all of these benefits are dependent on passage of HR 550. In

³ Solar Energy Industries Association Natural Gas Displacement Model

⁴ NREL report, “Distributed Energy Resources for the California Local Government Commission,” October 2000.

⁵ Sandia National Laboratories, Energy-Water Nexus, <http://www.sandia.gov/news-center/news-releases/2006/enviro-waste-mgmt/mapwest.html>

⁶ NREL Report No. NREL/FS-520-24619: “Energy Payback: Clean Energy from PV”

the absence of long-term Congressional leadership, we will continue down the path of over reliance on foreign, highly price-volatile, insecure, carbon-intensive energy sources.

The U.S. stands at an energy crossroads. Independent, carbon-smart energy choices can be made today that will benefit generations to come. However, the window of opportunity is quickly closing. This Congress has an opportunity to invest in solar energy and ensure that the U.S. reclaims global energy leadership and independence.

In conclusion, passing H.R. 550, the *Securing America's Energy Independence Act*, is the most meaningful solar policy that Congress could enact this year.

I thank the committee for giving me this opportunity to speak, and I am available to answer any questions you may have.

APPENDIX

Photovoltaics (PV)

Technology



Photovoltaic (PV) devices generate electricity directly from sunlight via an electric process that occurs naturally in certain types of material. Groups of PV cells are configured into modules and arrays, which can be used to power any number of electrical loads.

Crystalline silicon—the same material commonly used by

the semiconductor industry—is the material used in 94% of all PV modules today. PV modules generate direct current (DC) electricity. For residential use, the current is then fed through an inverter to produce alternating current (AC) electricity that can power the home's appliances.

The majority of PV systems today are installed on homes and businesses that remain connected to the electric grid. Consumers use their grid-connected PV system to supply some of the power they need and use utility-generated power when their power usage exceeds the PV system output (e.g., at night). In 41 U.S. states, when the owner of a grid-connected PV system uses less power than their PV system creates, they can sell the electricity back to their local utility, watch their meter spin backwards, and receive a credit on their electric bill—a process called **net metering**. The electric grid thus serves as a “storage device” for PV-generated power.

Markets



The global PV market has averaged 38% annual growth over the last five years. Yet PV still accounts for a small percentage of electricity generation worldwide and less than 1/30th of 1% in the U.S. Furthermore, the U.S. lags behind Germany and Japan in installations as well as in manufacturing. Germany and Japan have surged to the lead with coherent, long-term national incentive policies, despite dramatically inferior amounts of sunshine.

The U.S. possesses the best solar resources in the world, and yet Germany installs **seven-times as much PV as the U.S.** Germany and Japan have taken the lead in solar manufacturing and installations because of long-term national incentive policies designed to make solar power mainstream. Japan instituted a carefully designed rebate program that lasted over ten years, while Germany incentivizes solar installations by paying 3–4 times retail electric rates for the electricity generated from PV systems for 20 years. The surging player in the industry, China, has gone from having no PV industry to manufacturing twice the level of the U.S. in just three years.

While California is the dominant U.S. market for PV, with 73% of the grid-tied installations in 2006, other states now offer modest PV incentives for consumers, including Massachusetts, Connecticut, Illinois, New York, Oregon, Wisconsin and Washington State. California, Texas and Pennsylvania have long-term policy commitments to develop solar in-state. Major PV manufacturing expansions have occurred in some of the states hardest hit by the outsourcing of U.S. jobs, including California, Washington State, Oregon, Michigan, and Massachusetts.

Concentrating Solar Power Technology



Concentrating solar power (CSP) plants are utility-scale generators that produce electricity by using mirrors or lenses to efficiently concentrate the sun's energy. Two principal CSP technologies are parabolic troughs and dish-Stirling engine systems.

A parabolic trough plant in California's Mojave Desert.

Using curved mirrors, **parabolic trough**

systems concentrate sunlight to drive conventional steam turbines. The mirrors focus the sun's energy onto a receiver pipe or heat collection element. From there, a high temperature heat transfer fluid picks up the thermal energy and uses the heat to make steam. The steam drives a conventional steam-Rankine power cycle to generate electricity. A typical collector field contains many parallel rows of troughs connected in series.

A Stirling dish-engine system at Sandia National Labs.



A solar **dish-engine** system is shaped much like large satellite dishes and covered with curved mirrors. The dish is programmed to always face the sun and focus that energy on a receiver at the dish's focal point, in much the same way that a satellite dish focuses radio waves on a tuner. The receiver is connected to a Stirling engine, which uses the thermal power generated by the focused solar energy to

heat liquid hydrogen in a closed-loop system. The expanding hydrogen gas creates a pressure wave on the pistons of the Stirling engine, which spins an electric motor, creating electricity. Individual dish-Stirling units range in size from 10 to 25 kW. With their high efficiency and modular construction, dish-engine systems are expected to be cost-competitive in distributed markets.

Markets

During the 1980s and early '90s, developers built nine concentrating solar power plants in California's Mojave Desert. Then, for nearly two decades, no new plants were built—due to the erosion of federal support for renewables and plummeting energy prices. Yet in the current climate of rising natural gas prices, water scarcity, air pollution and carbon management concerns, concentrating solar power has the potential to play a major role in meeting the Southwest's future energy needs.

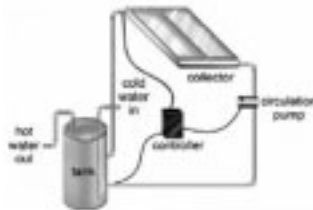
The Western Governors' Association recently commissioned a Solar Task Force to report on the potential for clean solar development in the Southwest. The Solar Task Force Report, adopted in July 2006, identified areas with a potential for CSP generation capacity of approximately 200 gigawatts (GW). This capacity could produce about 473,000 gigawatt hours (GWh) per year.

Solar Thermal Systems

Technology

Solar thermal systems provide environmentally friendly heat for household water and space heating. The systems collect the sun's energy to heat either air or a fluid. The air or fluid then transfers solar heat to your home or water. In many climates, a solar heating system can provide a very high percentage (50 to 75%) of domestic hot water energy. In many northern European countries, combined hot water and space heating systems are used to provide 15 to 25% of home heating energy.

Diagram of an active solar thermal system.



Active solar water heating systems can be either "open loop," in which the water to be heated flows directly through the

rooftop collector, or "closed loop," in which the collector is filled with an antifreeze solution that passes through a heat exchanger mounted in or around your normal water heater. During the day, in good weather, your water can be heated entirely by the sun. In any weather, the heating system can back up your existing heater, reducing overall energy costs.

Markets



In the absence of coherent national policies, from 1997 until 2005, the U.S. solar water heating and solar space heating market showed little growth, averaging about 6,000 installations per year. In the past year, numerous states, including New York, Florida, Hawaii, and Illinois, have created or expanded incentives to complement the new federal tax credits. Accordingly, the market is projected to increase 25 to 50 percent in 2007.

An installer mounts a solar water heater flush to the roof.

On the manufacturing side, the past year has seen an influx of new entrants into the U.S. market, and the introduction of new systems that use polymer-based collectors (as opposed to sheet metal). However, domestic manufacturers have stated that with a two-year window for the federal credit, they are unlikely to ramp up production substantially until a long-term market policy has been established.

Mr. RESCH. And, Mr. Chairman, at this time I would like to request and attach to my testimony several letters that were written that, unfortunately, I was not able to get into my original testimony in support of a long-term extension, including: those from 25 environmental organizations; another letter from the Western Governors' Association; a letter supporting the bill from the National Association of Regulatory Utility Commissioners, NARUC; a letter from 13 utilities, including the Edison Electric Institute; a letter from the Secretary of Energy from the Commonwealth of Massachusetts, a personal letter to you, sir.

Chairman NEAL. Smart move.

[Laughter.]

Mr. RESCH. I would like to include these with my testimony, if possible, sir.

Chairman NEAL. Without objection.

[The attachment to Mr. Rhone Resch's statement follows:]

Chairman NEAL. Mr. Rose.

STATEMENT OF ROBERT R. ROSE, EXECUTIVE DIRECTOR, U.S. FUEL CELL COUNCIL

Mr. ROSE. Thank you very much, Mr. Chairman, Members of the Committee. I see representatives from several fuel cell centers

of excellence here, including Connecticut and Upstate New York. And eastern Pennsylvania and California also have significant fuel cell capacity. I am Bob Rose, I am representing the U.S. Fuel Cell Council. We are the trade association of the industry. And I appreciate this opportunity.

The Committee showed commendable leadership in 2005 with the tax incentive provisions encouraging early deployment and adoption of fuel cells and related infrastructure. You know, prior to 2005, Federal market support for fuel cells was actually quite limited. And when it did come, it was in the form of direct support to purchasers. Both our industry and our markets are still adjusting to this new way of doing business that you have presented us with.

And I am pleased to report that it appears that the credit is already beginning to prove its worth to our industry. So the value of your leadership can't be overstated by us, and I want to make sure to thank you all today.

We also, as do my colleagues here, support a long-term extension of the investment tax credit for fuel cells.

Fuel cells are meeting customer needs today in high-value niche markets. We list something like 30 products on offer on our U.S. fuel council website. Typically, these products have, you know, guarantees and other commercial terms. That is so often the case with emerging technologies—their price limits their competitiveness in the larger marketplace.

This Subcommittee has long recognized the importance of Federal tax policy in filling in that valley of death for advanced energy technologies that carry a public benefit, and I am sure my colleagues can share with you some of the successes that their industries are now beginning to enjoy, as a result of the Committee's long-term support. My industry is kind of on the threshold of that commercial expansion, and so we need your help, really, kind of from the very beginning.

We also support H.R. 550, which has a—not just the long-term extension, but also several other provisions that would be of value to our industry. I certainly want to recognize Congressmen McNulty and Camp and their 52 cosponsors on that bill.

As I said, our experience with the incentive is limited. The first—the returns from 2006 will really be the first ones where there is a significant number of credit claims, although there were a few deals done in 2005. We can't really link sales to the specific sales to the availability of the credit, although customers have said they're using it. And at least one energy service company said it has managed to place about 100 fuel cells already under the credit. For us, that is a significant number.

Creative minds are also linking the Federal credit with incentives offered by the states and in the—indeed, there are several states that have very aggressive programs to help us deploy fuel cells. And it's this combination of incentives, and not the Federal credit alone, that has made the crucial difference for some of our companies.

In fact, these companies estimate that closer to \$3,000 a kilowatt is needed to fully open markets in all the states, particularly those states that don't have programs of their own.

I am going to share now my recommendations, which are going to sound quite a bit like the other guys' recommendations. But I did want to get on the record our formal view.

We do seek an eight-year extension of the tax credits in section 48 and in 25D. This is going to provide us with certainty and stability for our purchasers, stimulate cost reduction. It will also stimulate supply chain interest, which is extremely important to our industry.

It will also send a positive signal to capital markets, and indeed, give our companies the courage and incentive to build out their manufacturing capability.

We hope the Committee will examine the adequacy of the current \$1,000 per kilowatt cap, which some companies, as I said, report as insufficient to open markets for them nationwide.

We hope the Committee will also signal the most inclusive interpretation of the credit. This is going to insure, we think, that the credit achieves its intended purpose, as the range of products and markets expands.

We hope you will clarify the ability to transfer or trade credits, which is important for—to get non-tax-paying entities in the game, and also to facilitate the formation of investment pools.

We endorse the AMT modification proposed in H.R. 550. Individuals of means are very often the best early adopters of technologies, as my colleague Rhone has said, in buying his solar system. The AMT negates their access to this tax incentive, and I think that would be an important change for us.

And, finally, we request that the eligibility be explicitly provided for systems located in U.S. territories. There are markets there that we are having a hard time serving because of the Tax Code prohibitions.

Finally, we also recognize and applaud the Congressional interest in supporting hydrogen infrastructure, which will help fuel cells, as well.

In conclusion, thank you again. We are grateful for your leadership, and we appreciate the chance to come up here and say so.

[The prepared statement of Mr. Robert Rose follows:]

Statement of Robert R. Rose, Executive Director, U.S. Fuel Cell Council

Chairman Neal, Ranking Member English, Members of the Committee, I appreciate the opportunity to appear today to support a long-term extension of the investment tax credit for fuel cells. The U.S. Fuel Cell Council is a trade association of more than 105 members spanning all segments of our industry. We support commercialization of fuel cells of all types and for all applications.

Fuel cells are a family of technologies that generate power electrochemically. Since there is no combustion, fuel cells are highly efficient with ultra low emissions. Fuel cells can utilize a wide variety of fuels, with unexcelled environmental performance. Overall, fuel cells deliver an exceptional combination of benefits to society.

Fuel cells can power an extraordinary range of applications, from battery replacements in consumer electronics, to backup and remote power generation, auxiliary power units, combined heat and power systems and high efficiency base load electrical generation. They are also being developed for mobile power systems, specialty vehicles like forklifts and airport equipment, and for any vehicle that carries people, including transit buses and the family car.

Fuel cells are meeting customer needs today in high-value niche markets, but as is so often the case with emerging technologies, their price limits their competitiveness in the larger marketplace. Capturing fuel cells' benefits for our society will require active public-private partnerships in all stages of development and demonstra-

tion and in preparing markets through financial incentives, infrastructure investment and removal of regulatory and economic barriers.

This committee has shown commendable leadership in approving a variety of tax incentives to encourage the deployment and early adoption of fuel cells and related infrastructure. The value of that leadership to our industry cannot be overstated, and we thank you.

Building on that beginning, a long-term extension of the Sec. 48 fuel cell investment tax credit (ITC) is our highest priority before this Committee. HR 550, introduced by Congressmen McNulty and Camp with strong, bipartisan support, captures the spirit of this need. A long-term extension will provide support now for early adopters in the private sector, and also accommodate the reality of our industry—that fuel cells are a family of technologies, with divergent commercialization pathways and time tables and an expanding product mix.

The U.S. Fuel Cell Council reports that more than 30 products are available today, typically with guarantees, warranties and other commercial terms. But U.S. sales were below \$200 million in 2005, based on voluntary reporting. A strong, stable and long-term investment tax credit will stimulate this nascent domestic industry by enlarging early markets.

- § A long-term extension will increase production volumes and lead to lower costs.
- § It will give customers experience with fuel cells, helping fuel cell developers improve their products based on that experience.
- § The credit gives developers—and their investors—confidence to build capacity.
- § It also helps attract suppliers and their innovations—a matter of fundamental importance to our industry.
- § And, of course, it creates jobs and strengthens the nation's technological competitiveness.
- § Finally, a long term commitment recognizes the evolution of the range of fuel cell technologies and products.

This Committee has long recognized the importance of federal tax policy in stimulating acceptance of advanced energy technologies, given energy's crucial value to our economy and security. Tax support for solar and other technologies dates back to the 1970s. It has taken time, but those industries are now deploying at a remarkable pace, and that exciting expansion will continue with the continued support of this Committee. The fuel cell industry is at the threshold of a commercial expansion of its own, and also needs a steadfast commitment from government.

Experience with the Investment Tax Credit

The fuel cell installation tax credit is less than two years old so Council members' experience with this incentive has been limited so far. The returns from 2006 will be the first to reflect use of the credit in the real world.

While the nature of the credit does not allow us to link sales directly to the availability of the credit, customers have begun telling fuel cell companies that they intend to take advantage of the credit. I can report anecdotally that more than 100 fuel cell units have been or soon will be installed by one energy services company in transactions involving the credit.

Federal market support for fuel cells has been modest in the past and when it came, it was in the form of direct support to purchasers. Both our industry and our markets are still adjusting to this new way of doing business. The certainty provided by a long term extension would help immeasurably. The purchase cycle can be as long as 18–24 months for some companies. A long term extension will assure customers that the credit will be there when the units arrive. We have every expectation that the credit will prove its worth during 2007 and beyond.

Creative minds also are linking the federal credit with incentives offered by the States. Indeed this combination of incentives—and not the federal credit alone—has made the crucial difference for some companies in closing deals. These companies estimate that closer to \$3,000 per kilowatt is needed to fully open markets in all the States.

Use of the credit also has been affected, frankly, by the difficulty in gaining a formal statement by the Internal Revenue Service (IRS) in response to technical questions about the credit and its application. Perhaps it is because we are new at this. But our industry sought the comfort of a formal statement from IRS about how the credit would work, similar to those produced by IRS in other cases.

Our questions concerned the interplay between the ITC and other federal and state incentives; clarification of the subsidized energy financing / Industrial Development Bond (IDB) language, "placed in service" language, and application to lease arrangements; application of the credit to units like fork lifts and similar material handling equipment that are not fixed, but also are not "passenger vehicles;" and

the availability of the credit in Puerto Rico. These issues will be interpreted by the taxpayer for 2006, and as you might imagine this is the cause of some unease.

Thus a seemingly small thing, a mere matter of the lack of a few of paragraphs in the *Federal Register*, inadvertently has added uncertainty and confusion to a process that carries so much promise for fuel cell developers and users.

Recommendations

- The USFCC advocates an eight year extension of the tax credit. This will provide certainty and stability for purchasers, stimulate cost reduction and supply chain interest, and send a positive signal to capital markets.
- We encourage the committee to examine the adequacy of the current \$1,000 per kilowatt cap which some companies report is insufficient to open markets nationwide for many fuel cell products.
- We hope the committee will also signal the most inclusive interpretation for the credit. This will address some remaining questions as to applicability in current markets and also assure that the credit achieves its intended purpose as the range of products and markets expands.
- We ask you clarify the ability to transfer or “trade” the value of the fuel cell ITC, so non-taxpaying entities may take advantage of the incentive, and to facilitate the formation of investment pools.
- We request that eligibility be explicitly provided for systems located in U.S. territories thus expanding the market and helping industry to respond to existing demand.

The U.S. Fuel Cell Council also recognizes and applauds Congressional interest in supporting the emerging hydrogen energy infrastructure, via proposals such as H.R. 805. Incentives for hydrogen will help fuel cells enter important near term markets. Hydrogen systems that serve niche markets in the short run can be made available to supply passenger vehicles a few years from now.

The Energy Policy Act of 2005

The Energy Policy Act of 2005 provides an exceptional policy outline for fuel cells and supporting hydrogen infrastructure. Yet more is needed if fuel cells are to achieve their commercial potential, and yield their benefit to society. The most critical policy needs today are long-term tax incentives for fuel cell purchases, federal purchase programs and appropriations for research, development and demonstrations that live up to the promise of EPACT 2005.

Tax Provisions Affecting Fuel Cells and Hydrogen

The Energy Policy Act of 2005 established an Investment Tax Credit for business property (Section 48) and a parallel Investment Tax Credit for non-business property (Section 25D), which provide the purchaser of fuel cell property a credit equal to the lesser of \$1,000 per kW or 30 percent of the property cost.

The Act also provided a credit for Alternative Fueling Stations (Section 30C), including hydrogen, limited to the lesser of \$30,000 or 30 percent.

The Act provides Fuel Cell Vehicle Tax incentives (Section 30B), based on vehicle weight.

The U.S. Fuel Cell Council

The U.S. Fuel Cell Council is the trade association of the industry, dedicated to commercialization of fuel cells in the United States. Our membership includes producers of all types of fuel cells, major suppliers, automakers and their suppliers, universities and other research institutions, fuel cell customers, hydrogen and other energy providers, government agencies, nonprofit organizations, and allied trade associations.

Formed in 1998, the U.S. Fuel Cell Council has grown to more than 105 members, who provide leadership on eight working groups focusing on all critical aspects of development, marketing and deployment and advocacy of fuel cell systems and related infrastructure for all members of the family of fuel cell technologies. The USFCC annually sponsors a Congressional Fuel Cell Expo on Capitol Hill, scheduled this year for May 15 in the Cannon Caucus Room.

State of the Industry

While the science of fuel cells was born in Europe in the 19th Century, the first commercial fuel cells were made and purchased in the U.S., for the Gemini space program. Advanced pre-commercial fuel cell cogeneration systems and the first fuel cell buses were deployed in the early 1990s. By the turn of the current century, systems were under active development for an extraordinary range of applications, from tiny battery replacements to multi-megawatt power systems, from boats to locomotives, from two-wheel vehicles to transit buses.

Several hundred U.S. companies and research institutions are working on fuel cells, and private investment continues to surpass government investment. U.S. fuel cell companies reported employing more than 3,200 workers, and investing nearly \$500 million in research. These numbers are the best available, but they based on voluntary reporting and they significantly *under* estimate total investment and employment in the U.S. Fuel cell activity is under way in nearly every state.

There is an intense international competition to commercialize fuel cells. The European Community and individual countries of Europe—including Iceland and Germany—and in Asia, Japan, China and Korea, all have ambitious development programs. Japan's fuel cell research program has more than tripled since 1995. Japan's aggressive research program for power generation includes deployment of more than 1,250 units. Japan has set ambitious fuel cell commercialization targets.

Meeting Customer Needs

Fuel cells are commercially available today in some markets, such as stationary base load power, goods movement, telecommunications and backup power or specialty power systems, where their unique benefits bring special value. Full commercialization in all markets on an accelerated timetable will require collaboration between government and private industry, including a substantial public investment in research and development, demonstration and pilot programs, early commercial purchases, incentives for early adopters, and removal of market barriers. The public investment in fuel cells needs to be no larger than traditional levels of support for other domestic energy technologies, and may be more cost effective. The public benefit will far outweigh the cost.

Perhaps the most encouraging evidence to date of the commercial potential of fuel cells is the enormous investment the private sector has committed to the technology since 1995. In short, there is a robust private effort already under way.

As mentioned earlier, fuel cells are a family of technologies. Each has unique technical issues and approaches to commercialization. A comprehensive national strategy for fuel cells should address the unique requirements of the portable (micro), stationary and transportation markets and take advantage of the common elements that can be identified among the applications.

This undertaking will require careful consideration of shared infrastructure requirements, the design of research, development and demonstration (RD&D) efforts that offer generic benefits, and strategies that reflect the market entry sequence for the various fuel cell products. It will also require investment in advanced feedstock and hydrogen carrier fuels and in improving technologies to make, store and transport these fuels. Portable (micro) fuel cell products, for example, are expected to lead the way in commercialization of fuel cell consumer products and, according to the U.S. DOE, will help catalyze other markets.

Education, training and customer acceptance are an important part of the effort, beginning in schools and extending to vocational and professional education and to the public.

Summary

The current investment tax credit has begun to do its job even in its infancy, and our industry is grateful to you for your leadership. We look forward to working with you and the Committee on these issues.

Chairman NEAL. Thank you.
Mr. Dinneen?

STATEMENT OF BOB DINNEEN, PRESIDENT AND CEO, RENEWABLE FUELS ASSOCIATION

Mr. DINNEEN. Thank you, Mr. Chairman. Thank you for convening this very timely and important hearing. And I would like to thank the Members of the Subcommittee as well who are in attendance today. And I am pleased that we are joined by Congressman Pomeroy and Congressman Weller, whose leadership on renewable fuels has been extremely important to helping to build the industry that we have today.

Rhone mentioned that he put in a solar panel unit in his home. I guess it's incumbent upon me to acknowledge that I drove to this

hearing today in an ethanol-powered car. I apologize, however, for not doing what Jaime did, in bringing some alcohol fuel to this important hearing, but maybe next time.

Tax policy can, indeed, be a critically important and effective means of changing markets to pursue important public policy objectives. And the proof of that can be seen in the success of the Federal tax incentive program for ethanol over the past several years.

Today, the ethanol industry comprises 115 plants that are in operation across 19 different States. We process approximately 2 billion bushels of grain into about 6 billion gallons of high quality, high octane performance fuel, and about 12 million metric tons of feed grain for livestock and poultry industries.

Ethanol has become ubiquitous in the Nation's motor fuel system. We've blended in 46 percent of the Nation's fuel today. But we're not done yet. There are, in fact, 79 ethanol plants that are under construction today that will add another 6 billion gallons of ethanol production capacity. We are among the fastest growing renewable energy industries in the world, and it is a direct result of the tax programs that have been put in place.

Now, the Members of the Subcommittee, not many of them are from the Midwest with real ethanol production. Congressman Pomeroy and Congressman Weller have certainly seen firsthand the benefits of ethanol production. But I did a quick review, and I can tell you that as the ethanol industry grows and expands, we are growing far beyond the Midwest.

There are, indeed, four plants that are in operation in Texas—or are under construction in Texas, rather. There is a plant under construction in Washington. There are two plants under construction in Oregon. There are two plants under construction in New York. There is a plant in operation in Georgia, and one under construction in Georgia, and there are three plants under construction in Wisconsin.

Mr. Chairman, I apologize. I have got nothing in Massachusetts. However, it should come to some—

Chairman NEAL. That will not help you.

[Laughter.]

Mr. DINNEEN. I do want to tell you, though, that the president of the industry's trade association is from Massachusetts, and he had the good sense to marry a beautiful woman from Pennsylvania, another state, unfortunately, where we don't have anything yet. But we will soon.

The fact of the matter is, the industry is unrecognizable from what it was 5 years ago, and it will be unrecognizable again 5 years from now, because as new capital comes in to the industry, as we move beyond the traditional Midwest, new intellectual capital is coming in, as well.

The industry is embracing new technologies to become more efficient. We are embracing new feed stocks. And the future of our industry is one in which grain and cellulosic feed stocks, which are available in every State in the country and every corner of the globe, is going to be part of the future. We are excited about that future.

The ethanol industry today, however, is, indeed, contributing significantly to the Nation's energy, economic, and environmental se-

curity. A report that we had done for the association earlier this year looking at the 5 billion gallons of ethanol that was produced last year showed that ethanol added \$41 billion to gross output in our Nation's economy. We are responsible for 160,000 jobs across the economy. We added \$2.7 billion to Federal tax revenue, and we reduced oil imports by 170 million barrels, which are valued at more than \$11 billion.

From an environmental perspective, the 5 billion gallons of ethanol that were produced last year reduced greenhouse gas emissions by some 8 million tons. Mr. Chairman, that's the equivalent of taking 1.2 million vehicles completely off the road.

Maintaining this important industry is critical. We are still just a small part of the 140 billion gallon gasoline market in this country. We are making great strides today. But being able to continue that, we're going to have to continue the policies that have made that happen.

So, much as everybody else in the renewable community, it is imperative that we continue the ethanol tax incentive program. Congressman Pomeroy and Congressman Hulshof have introduced legislation, H.R. 196, that would extend the ethanol tax incentives, and make this industry—allow us to move forward with a great deal more certainty.

The program has been extraordinarily successful, both in terms of building the industry and in terms of its cost effectiveness. While the tax incentive costs the taxpayer \$2.5 billion last year, we provided \$2.7 billion in increased tax revenue. And more importantly, the increased demand for grain caused by ethanol production reduced Federal farm program costs by more than \$6 billion, returning \$4 to the treasury for every \$1 invested in this important domestic industry.

Mr. Chairman, this is an important hearing. We look forward to working with you as we move forward.

[The prepared statement of Mr. Bob Dinneen follows:]

**Statement of Bob Dinneen, President and Chief Executive Officer,
Renewable Fuels Association**

Good afternoon Chairman Neal, Ranking Member English, and Members of the Subcommittee. My name is Bob Dinneen and I am president and CEO of the Renewable Fuels Association, the national trade association representing the U.S. ethanol industry.

This is an important and timely hearing, and I am pleased to be here to discuss U.S. energy tax policy. Tax incentives have played a critical role in supporting the development of our domestic biofuels markets, making U.S. ethanol and biodiesel the fastest growing renewable energy resources in the world today.

In 2006, the U.S. produced a record 4.9 billion gallons of ethanol, displacing the equivalent of 206 million barrels of crude oil valued at \$13.6 billion. Since an increasing share of our oil is imported, this displacement means that these dollars were spent and invested in the U.S. and not sent abroad to foreign suppliers. Ethanol today is the single most important value-added market for farmers, and is revitalizing rural communities across the country. Finally, as ethanol is produced from agricultural feedstocks taking carbon out of the atmosphere, it is the only real strategy to address climate change in place today, actually lowering greenhouse gas emissions by 8 million tons in 2006.

The single most important federal policy driving these impressive results is the tax incentives available to refiners that choose to blend biofuels into gasoline and diesel fuel today.¹

Background

Today's ethanol industry consists of 115 biorefineries located in 19 different states with the capacity to process almost 2 billion bushels of grain into 5.7 billion gallons of high octane, clean burning motor fuel, and more than 12 million metric tons of livestock and poultry feed. It is a dynamic and growing industry that is revitalizing rural America, reducing emissions in our nation's cities, and lowering our dependence on imported petroleum.

Ethanol has become an essential component of the U.S. motor fuel market. Today, ethanol is blended in more than 46% of the nation's fuel, and is sold virtually from coast to coast and border to border.

The ethanol industry provides a significant contribution to the American economy. According to an analysis completed for the RFA², the approximately 4.9 billion gallons of ethanol produced in 2006 resulted in the following impacts:

- Added \$41.1 billion to gross output;
- Created 160,231 jobs in all sectors of the economy;
- Increased economic activity and new jobs from ethanol increased household income by \$6.7 billion, money that flows directly into consumers' pockets;
- Contributed 2.7 billion of tax revenue for the Federal government and 2.3 billion for State and Local governments; and,
- Reduced oil imports by 170 million barrels of oil, valued at \$11.2 billion.

In addition to providing a growing and reliable domestic market for American farmers, the ethanol industry also provides the opportunity for farmers to enjoy some of the value added to their commodity by further processing. Farmer-owned ethanol plants account for 43 percent of the U.S. fuel ethanol plants and almost 34 percent of industry capacity. There are currently 79 biorefineries under construction. With seven existing biorefineries expanding, the industry expects more than 6 billion gallons of new production capacity to be in operation by the end of 2009.

Tax Incentives

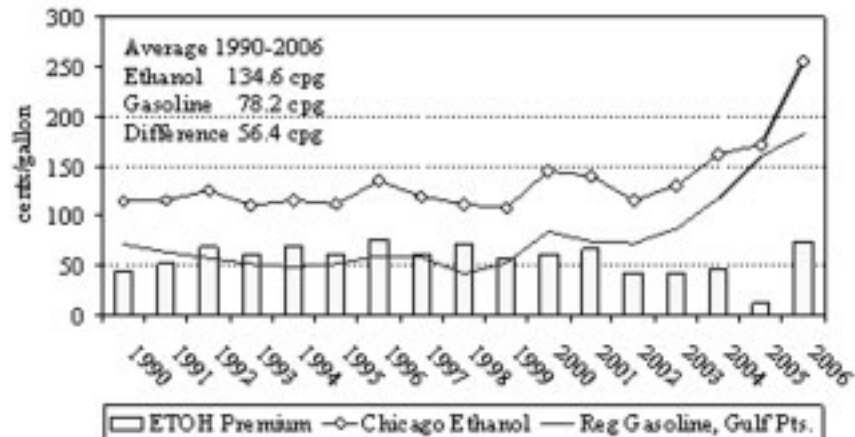
The most significant tax incentive encouraging the expanded use of ethanol is the VEETC.³ The VEETC gives gasoline marketers and blenders an important incentive to blend ethanol with their gasoline. Historically, ethanol has not been competitive with gasoline as a fuel. As shown in Figure 1, spot market ethanol prices have been almost twice that of spot regular gasoline prices over the past twenty years.

¹The Volumetric Ethanol Excise Tax Credit (VEETC) provides gasoline blenders/refiners with a federal tax refund of 51 cents per gallon of ethanol on each gallon of ethanol blended with gasoline, providing an important incentive to blend ethanol with their gasoline. The volumetric excise tax credit for agri-biodiesel is \$1.00 per gallon, and the volumetric excise tax credit for biodiesel is 50 cents.

²*Contribution of the Ethanol Industry to the Economy of the United States*, Dr. John Urbanchuk, Director, LECG, LLC, December, 2006.

³The first federal tax incentive for ethanol was the partial exemption for ethanol from federal excise taxes on motor fuel enacted as part of the Energy Tax Act of 1978. The partial exemption was set at 4 cents per gallon for motor fuels that contained at least 10 percent ethanol (or 40 cents per gallon for every gallon of ethanol). The tax exemption was increased to 6 cents per gallon in 1984. The Omnibus Budget Reconciliation Act of 1990 reduced the rate of exemption to 5.4 cents per gallon. This level was maintained until it was reduced by the 1998 Transportation Equity Act for the 21st Century. This legislation reduced the exemption to 5.3 cents per gallon for 2001 and 2002, 5.2 cents per gallon for 2003 and 2004, and 5.1 cents per gallon through December 31, 2010. The American Jobs Creation Act of 2004 replaced the partial excise tax exemption for ethanol with the VEETC. Under current law blenders and marketers are required to pay the full federal excise tax on motor fuel but can claim a tax credit or refund of 51 cents per gallon of ethanol blended with gasoline. All excise taxes are deposited into the Highway Trust Fund and the VEETC is paid out of the General Fund.

Figure 1
Spot Market Ethanol and Gasoline Prices



LECG, January, 2007

The VEETC protects ethanol producers from declines in oil and gasoline prices over which they have no control. Since ethanol is sold as an additive to motor gasoline, its price is determined more by oil and gasoline than by ethanol supply. An analysis of ethanol prices over the 1990 to 2005 period indicates that the spot market price of ethanol increases 4.6 percent for every 10 percent increase in spot market gasoline prices, but declines only 1.8 percent for every 10 percent increase in ethanol production. Consequently ethanol producers are price takers with their revenue determined largely by developments in the oil and gasoline markets.

Economic theory suggests that a new national industry should be able to gain a significant market share within the domestic market before tax incentives are phased out or abolished. Thus, RFA supports legislation such as the Pomeroy-Hulshof "Renewable Fuels and Energy Independence Promotion Act" (H.R. 196) to make permanent the biodiesel and ethanol tax incentive and the small agri-biodiesel producer and small ethanol producer credits, creating a permanent foundation for these industries. Consistency in Federal policies will send the necessary and appropriate signals to the marketplace. Maintaining and extending the existing tax incentives for ethanol and biodiesel are essential for continued growth of the industry.

Because the VEETC does not discriminate as to the nation or origin of the ethanol blenders' use, it allows foreign ethanol producers the benefit of the incentive. In order to offset the incentive foreign producers are eligible for, Congress implemented a credit offset, in the form of a secondary tariff, to prevent American tax payers from subsidizing foreign ethanol industries. The balancing act between the VEETC and the secondary tariff has proved effective and must be continued to ensure America is not subsidizing foreign ethanol production.

Finally, it should be noted the federal ethanol tax incentive program has been extremely cost effective. The \$2.7 billion in increased federal tax revenue attributable to the ethanol industry is in itself 160 million more than the estimated cost of the Volumetric Ethanol Excise Tax Credit (VEETC), assuming the 4.9 billion gallons of ethanol produced were blended. At a January 10, 2007 Senate Agriculture, Nutrition and Forestry Committee hearing, however, U.S. Department of Agriculture's Chief Economist, Keith Collins, noted that high crop prices, due in part to the strong domestic market for ethanol, led to a 6 billion *savings* for the Federal government from reduced farm program payments in 2006. Thus, with increased tax revenue and reduced farm program costs, the taxpayer realized a \$4 return for every \$1 invested in domestic renewable energy last year.

New Technologies

The ethanol industry today is on the cutting edge of technology, pursuing new processes, new energy sources and new feedstocks that will make tomorrow's ethanol industry unrecognizable from today's. Ethanol companies are already utilizing cold starch fermentation, corn fractionation, and corn oil extraction. Companies are pursuing more sustainable energy sources, including biomass gasification and methane digesters. There is not an ethanol company represented by the RFA that does not have a cellulose-to-ethanol research program. These cutting edge technologies are reducing energy consumption and production costs, increasing biorefinery efficiency, improving the protein content of feed co-products, utilizing new feedstocks such as cellulose, and reducing emissions by employing best available control technologies.

The technology exists to process ethanol from cellulose feedstocks; however, the commercialization of cellulose ethanol remains a question of economics. The capital investment necessary to build cellulose facilities remain about five times that of grain-based facilities. Those costs will, of course, come down once the first handful of cellulose facilities are built, the bugs in those "first mover" facilities are worked out, and the technology continues to advance. The enzymes involved in the cellulose ethanol process remain a significant cost, as well. While there has been a tremendous amount of progress over the past few years to bring the cost of those enzymes down, it is still a significant cost relative to processing grain-based ethanol. To continue this technological revolution, however, continued government support will be critically important.

The VEETC reduces the risk associated with investment in new technology, such as cellulosic biofuels. Typically, the financial community will invest in higher risk, non-traditional activities only with the assurance that their revenues will not be threatened by foreign or domestic competition. Continued existence of the VEETC is an effective risk reducing instrument for investors and the financial community who are key to further expansion of the U.S. ethanol industry, particularly the use of cellulosic feedstocks for ethanol production.

Climate Change

The RFA sees climate change as an opportunity to pursue policies that make sense on a variety of fronts, from protecting the environment to promoting U.S. energy security and economic development. The RFA promotes policies, regulations and research and development initiatives that will lead to the increased production and use of renewable fuels such as ethanol and biodiesel. The RFA is taking the climate change issue very seriously. Our members are producing a product that reduces climate change emissions from cars and trucks. The RFA itself has pledged to become carbon neutral. To follow through on this commitment, the RFA has joined the Chicago Climate Exchange, the world's first and North America's only voluntary, legally binding integrated greenhouse gas reduction and trading system for all six greenhouse gas emission sources, with offset projects in North America and worldwide. Once completed, the RFA will be offsetting 100 percent of its carbon emissions.

The RFA generally supports Federal efforts to address climate change, in part because one set of uniform, national standards can be more effective than several, overlapping state and regional approaches. While we cannot speak to the climate change impacts of all new technologies and fuels, we can address the greenhouse gas (GHG) emissions benefits of renewable fuels such as ethanol. The Pew Center for Global Climate Change recently concluded that renewable fuels offer the greatest immediate term opportunity to reduce GHG emissions from the transportation sector. This is true because renewable fuels are readily available and can be used without significant infrastructural or technological advancement. As you may be aware, the United States already uses more than 5.5 billion gallons of ethanol annually. In 2006, ethanol use in the U.S. reduced CO₂-equivalent emissions by approximately 8 million tons, according to the Department of Energy. This is the equivalent of removing 1.2 million cars from the road from a climate change perspective.

The U.S. Environmental Protection Agency (EPA) released a Regulatory Impact Analysis (RIA) with the Final Rule implementing the RFS on April 10, 2007. Chapter 6 of EPA's RIA, *Lifecycle Impacts on Fossil Energy and Greenhouse Gases* (GHG), included a displacement index showing the impact of replacing a BTU of gasoline or diesel with a BTU of renewable fuel. For every BTU of gasoline which is replaced by corn ethanol, the total lifecycle GHG emissions that would have been produced from that BTU of gasoline would be reduced by 21.8 percent. For every BTU of gasoline which is replaced by cellulosic ethanol, the total lifecycle GHG emissions that would have been produced from that BTU of gasoline would be reduced 90.9 percent.

The U.S. ethanol industry is in the midst of a remarkable evolution, utilizing new more energy efficient technologies with every new plant that opens and with upgrades made at existing biorefineries as the industry retools. Examples of new energy saving technologies include fluidized bed reactors that utilize the syrup from a biorefinery's evaporators to generate steam, and biomass gasification that allows ethanol plants to utilize locally grown biomass to power the plant. Still other ethanol plants are locating alongside feedlots, allowing them to feed the distillers grains (a high protein co-product of the ethanol production process) without having to dry the material first, while at the same time using the manure from the feed lot to power the plants. These technologies are not only making ethanol biorefineries more competitive, they are greatly reducing the carbon footprint of the industry.

The electric, natural gas and transportation sectors comprise a large majority of U.S. climate change emissions. Any climate program adopted by the Federal Government should encompass all three of these sectors (i.e. not leaving out the transportation sector). Efficiency is the most oft-stated approach to reducing GHG emissions in the transportation sector. It is equally important, however, to diversify the fuels market. One of the critical components to any strategy to diversify petroleum fuels is increased reliance on Flex-Fuel Vehicles (FFVs). Because FFVs run on virtually any combination of ethanol and gasoline, they help facilitate an unrestricted, truly competitive transportation fuels market. Like ethanol, FFVs are available now. Automakers including GM, Ford, VW, Toyota and Honda already provide FFVs to the Brazilian automobile market at very little cost. Reportedly, 81 percent of vehicles sold in Brazil in November 2006 were FFVs. FFVs are becoming increasingly popular in the U.S. However, more could be done to promote their manufacture and use. The RFA believes that all vehicles, whether gasoline powered, hybrid or advanced technology, should be flex-fuel. Enhancing incentives to gasoline marketers to install E-85 refueling pumps will continue to be essential. Federal policies should extend and expand tax incentives for E-85 refueling infrastructure, and create new consumer-based tax incentives to encourage the purchase of FFVs.

Conclusion

Mr. Chairman, a recent Public Opinion Strategies poll found that 78% of American support increasing the use of domestic renewable fuels such as ethanol. That reflects the growing consensus that we need to do everything possible to reduce our dangerous dependence on imported petroleum because of the attendant environmental and national security consequences of its continued use. Existing U.S. tax policies have made a difference, and can continue to drive investment in domestic renewable fuels such as ethanol and biodiesel. The VEETC, in particular, has played an integral role in supporting investment and development in ethanol production facilities and the significant growth of the industry. The continued existence of U.S. renewable energy tax policy will be critical to the rapid deployment and commercialization of new technologies for biofuels. The RFA looks forward to working with the Committee during the 110th Congress to ensure the U.S. ethanol industry continues to grow.

Thank you.

Chairman NEAL. Thank you very much.
Dr. French?

STATEMENT OF NINA BERGAN FRENCH, PH.D, DIRECTOR, CLEAN COAL COMBUSTION PRODUCTS, ADA-ES, INC., LITTLETON, COLORADO

Ms. FRENCH. Chairman Neal, Members of the Subcommittee, it is my privilege to be here today to present testimony on the importance of coal as a vital source of energy for the United States, and how Federal support in the form of R&D funding and tax incentives can be a catalyst to stimulate new clean coal technologies.

My name is Dr. Nina French. I am Director of Clean Coal Technologies for ADA Environmental Solutions. ADA is an environmental control technology company, and we provide environmental emissions control technologies and services to the coal-fired power industry. We are the market leader in commercial mercury, control

technology, and this year we started working on carbon capture technologies.

We are technology developers. We have 30 years of experience helping coal-fired power plants reduce emissions. We believe that keeping electricity flowing reliably and cheaply is a critical foundation to our economy. And without—with a strong economy—without a strong economy, the nation will not be able to maintain its strong environmental agenda.

I have three points I would like to make today. The first is that coal is critical to our future. It's an existing, reliable source of energy. It is baseload energy. It is inexpensive. We don't have to import it, and it is abundant. We have a 250-year-plus supply.

Coal needs to be part of a mixture for our energy source, a mixture that includes renewables, other fossil fuels, and nuclear. I think of coal as having two parts. One is our very vast and large existing infrastructure, and the other is coal in the future. The key question for the future becomes can we reduce greenhouse gas emissions to continue to rely on this important national resource? And my answer is this.

For 40 years, this industry has accomplished significant reductions in NO_x , SO_2 , and particulates. This is from the existing fleet. These are from boilers that were actually never designed to burn clean. We have made tremendous strides. We have retrofitted and adapted technologies to meet this new world clean emissions.

Then what is necessary to take the next step for clean coal? And I have two case studies I would like to briefly mention. The first is mercury control. We were faced with a hurdle in mercury. Private industry could not bear the full risk of early development. We had no regulations to drive technology development, and we had no technologies to provide the basis for regulations.

We were able to overcome these hurdles with early Federal support, resulting in successful development of commercial technology to provide 90 percent mercury reduction. The return on investment to the American citizen was tremendous.

As recently as 2005, studies were saying that mercury control would cost 350 billion. We have now shown that we can take 90 percent of the mercury out of coal-fired power plants for less than \$2 billion a year.

The second case study is refined coal. This section 45 tax credit has incentivized my company to develop a pre-treatment technology for coal that allows older boilers that don't have space for installation of new equipment to meet new mercury regulations and to reduce NO_x . This tax credit works because it's goal-oriented, not selecting a winning technology.

The goal is to reduce emissions. It also includes a 50 percent market value test that is workable with legislative clarification. This tax incentive has promoted new emission control options that would not have been considered, otherwise.

And that brings us back to the challenge of clean coal, of reducing greenhouse gases, specifically CO_2 , from coal-fired power plants. We have two approaches. The first and the most important is increasing efficiency. We need to make less carbon for each megawatt of electricity we produce. And for the new fleet, and some of the existing fleet of coal-fired power plants, we have tech-

nologies available today. The problem is, there is no incentive to use—to build a higher-efficiency plant. There is no incentive to spend the money.

The second part of greenhouse gas reduction is carbon capture and storage. There are a number of promising concepts on the table, but they are all in their infancy, and they will require massive research and development support to get them going.

What we know is the scale of carbon capture is enormous. History tells us that technology development implementation is going to be long, probably 10 to 20 years. But success is likely. To take coal into a carbon-constrained world, we need to carefully balance the timing between our carrots, which are tax incentives and technology development funding, and our sticks, which are regulations.

We need to incentivize goals, not pick winning technologies. For example, we need to incentivize carbon reduction, not a specific technology. And we need to encourage technology development through incentives and risk reduction programs, such as R&D support and tax credits, loan guarantees, and others.

We believe that, based on past accomplishments in our industry, given sufficient resources and incentives, we can make clean coal a reality. Thank you for your attention.

[The prepared statement of Ms. Nina French follows:]

Statement of Nina Bergan French, Ph.D, Director, Clean Coal Combustion Products, ADA-ES, Inc., Littleton, Colorado

Chairman Neal, Mr. English, and Members of the Subcommittee: It is a privilege to present testimony on the importance of keeping coal as a vital part of the Nation's energy mix and how Federal support in the form of R&D funding and tax incentives can be a catalyst to stimulate the development of innovative and cost-effective technology to address the control of emissions from coal-fired power plants. ADA provides the perspective of a technology development company who evaluates such measures as part of its business decisions on which market opportunities to pursue.

For the past 30 years, the scientists and engineers at ADA Environmental Solutions have built an international reputation for developing and commercializing highly efficient emissions measurement and control technologies for the power industry. In 2000, we began to focus our efforts on research, development, and demonstration of technology for reducing mercury emissions. Today, we are the market leader in providing commercial equipment to capture up to 90% of mercury generated by the combustion of coal. These experiences demonstrate the importance of the right Federal involvement.

My Testimony Today

Today I would like to give you my perspective of clean coal. I will discuss the following points:

- (1) Coal is critical to our future because it is reliable (base load capacity), inexpensive, abundant, and local.
- (2) We have demonstrated the ability to meet environmental challenges with NO_x, SO₂, particulates and mercury.
- (3) Federal incentives (e.g., tax credits) have been effective in advancing technology to ensure options exist and costs are reduced.
- (4) Success for new technologies depends on a careful balance between:
 - Incentives for technology development,
 - Time for risk mitigation, and
 - Regulation or tax-based market drivers ("sticks" and "carrots").
- (5) CO₂ control seems to be the next concern. Critical points are:
 - The scale is massive.
 - Timeframe is probably long—10 to 20 years.
 - Investment is critical.
 - History tells us success is likely.

- Investment and incentives need to be designed to ensure that:
 - multiple paths are followed,
 - and costs and risks are reduced.

Coal Is Critical To Our Future

Let me start by discussing why we, as an environmental technology company, believe that the continued use of coal is critical to sustainable, reliable power generation in the U.S.

America leads the way in environmentally-beneficial technologies. As regulations tighten, we continue to improve technology that improves the air we breathe and the water we drink. We reap these benefits because our strong economy allows us to allocate significant resources to these efforts. We need power generation that is inexpensive, reliable, and environmentally safe. Our future depends on it. We believe that coal provides domestic energy security, low-cost energy, and reliability. The country today is asking, "Can we make coal clean enough, and if so, how do we do it?" Today, more than 1,100 coal-fired boilers produce more than 50% of our nation's electricity. Statistics show that states that choose coal for generation are rewarded by low-cost electricity. Figure 1 shows that there is a strong correlation between the use of coal and the ability to provide inexpensive electricity.

Economic development requires enormous investments in all aspects of energy infrastructure and significant increases in power generation. The U.S. is expected to need 50% more electrical capacity by 2030. Any expansion of power supplies must recognize that no single energy source can meet our growing energy needs. This requires a portfolio of solutions, including efficiency gains, more renewables, new nuclear power capacity and new coal-based generation.

As renewables such as solar and wind power become a greater portion of our energy mix, it becomes even more important to maintain a source of reliable power that can operate continuously, day and night, and in all weather conditions. The reliability of coal-fired power plants has improved significantly over the years. Our plants have increased operational capacity from 59% in 1990 to between 80% and 85% in 2006. It's simple; we care more now. Electricity is a much more valuable commodity than it has ever been. This is the motivation that drives us to optimize our current investment. We really have no other choice as it would take decades to replace our current infrastructure.

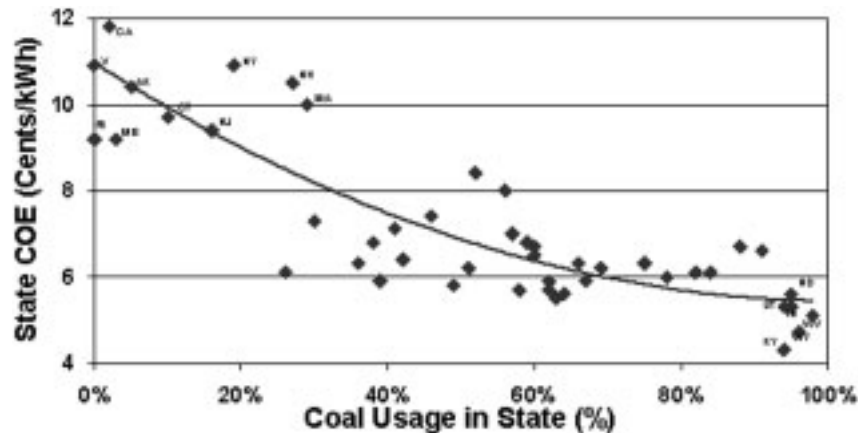


Figure 1. Cost of Electricity in a State as a Function of the Percentage of Electricity Produced from Coal.

Coal can also play an important role in national security by reducing our dependence on foreign energy sources. The United States has the largest coal reserve in the world, and America has more coal than any nation has of any single energy resource. At current consumption rates, these coal reserves could supply 250 years of fuel. This is far greater than our reserves of natural gas and oil combined.

For these reasons, coal remains an essential part of the U.S. generation mix as a secure, plentiful, and relatively inexpensive fuel source. However, we as a nation must determine how to continuously improve emissions. Our goal needs to be Clean Coal.

Clean Coal Background

The emissions control industry has made huge advancements in technology to improve emissions from coal-fired power plants. Collaboration among research organizations, universities, and power generation partners has enabled emissions of criteria pollutants sulfur dioxide (SO_2), nitrogen oxides (NO_x), and particulates from the existing fleet of coal fueled power plants to be lower today than they were in 1970, even as power produced from coal plants has increased by 173% (See Figure 2).

Reductions in NO_x , SO_2 , and particulate emissions were driven by a balance between technology development incentives and emissions regulations. Each made the other better. As an example, in the early 1970's flue gas desulfurization equipment, commonly referred to as "scrubbers," were new and suffered from poor reliability and performance. Over time, as experience was gained and equipment modified, efficiencies rose from about 70% SO_2 removal to today's 95 to 98%, with similar improvements in reliability. The emissions of criteria pollutants shown in Figure 2 will continue to decrease each year as emission control equipment is installed on more plants as a result of new regulations such as the Clean Air Interstate Rule.

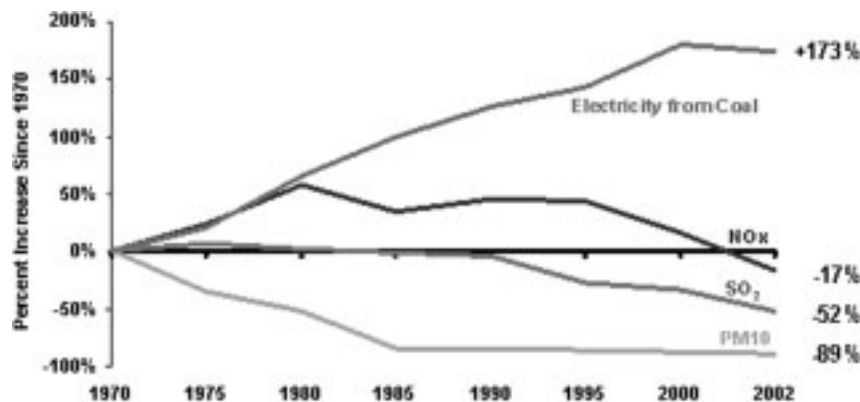


Figure 2. NO_x , SO_2 , and particulate emissions from coal-fired power plants continue to decrease even though we are.

Challenges in Developing New Emission Control Technology for the Power Industry

To understand how to make coal cleaner, it is helpful to appreciate how emissions control technology has developed for this industry. Since the first Clean Air Act of 1970, the power industry has gone through several rounds of implementing emissions control technology for NO_x , SO_2 , and particulates. In each case, there were very similar experiences as the new technology was applied in an industry where reliability and compliance are mandatory. We learned the following important lessons::

- Be prepared for unexpected reactions between flue gas constituents and chemical reagents used to control the pollutants;
- Do not underestimate the differences in coal and plant operating conditions to cause wide variations in emissions;
- Try to plan for significant O&M problems that might not show up until after long-term operation; and
- Look for secondary effects on other components of the power plants.

In each case, new-technology challenges had a significant impact on the reliability of power generation. The plants were forced to operate at reduced loads and suffered many unplanned shutdowns for maintenance and repair. Over time, technologies were improved to an acceptable level of cost and reliability. This is the true measure of acceptance. The impact depends on how widespread the technology was applied during the early adopter phase. For example, Hot-Side Electrostatic Precipitators (for particulate control) have cost the industry over a billion dollars. After initial successes, the technology was quickly applied to 150 power plants only to have a fatal flaw subsequently discovered.

One of the challenges with implementing new emissions control technology is that everything is so big. The scale is massive. For example, emissions control equipment for a 500 MW plant treats two million cubic feet of flue gas every minute. Scrubbers may be as large as the power plant to which they are attached. Remember that we need to add new emissions control technology without taking the plant off-line. We have learned that the best way to bring new technologies to an existing coal-fired power plant is to proceed through a carefully chartered course:

1. Laboratory testing: provides a cost effective means to determine general feasibility and test a variety of parameters.
2. Pilot-scale: test under actual flue gas conditions but at a reduced scale.
3. Full-scale field tests: scale up the size of the equipment and perform tests under optimum operating conditions to define capabilities and limits of the technology.
4. Full-scale field tests at multiple sites: each new site represents new operating conditions and new challenges.
5. Long-term demonstrations at several sites: Some problems will not show up until the first year or so of operation.
6. Widespread implementation: Problems will still be found at new sites, but most of the fatal flaws will have already been discovered and resolved.

We know from experience that trying to accelerate technology development by skipping these steps can result in large-scale operating problems and untimely and expensive plant outages. We also know that it takes ten to twenty years to successfully implement a major technology in this industry and implementation presents significant risks to the developer and user at each stage. In addition to the technology risk, there is significant financial risk to the developer. This is especially true when there is no regulation to guarantee a market will exist for a technology to control an emission that has not been previously regulated. There is often a “chicken and egg” dilemma in which there is no regulation to incentivize the development of a new technology and therefore there is no technology on which to base a regulation. Such was the case in the recent past, when the power industry was faced with reducing mercury emissions for the first time.

ADA-ES Experience in Developing and Implementing Mercury Control Technology

It is instructive to present a case-study on how Federal initiatives effectively provided incentives and risk mitigation that allowed industry to successfully develop cost-effective mercury control technologies for coal-fired power plants.

Methylmercury, which builds up in certain fish, is a neurotoxin that leads to developmental problems in fetuses of pregnant women. Mercury contained in coal represented the largest man-made source of mercury. In December 2000, the EPA announced that it was beginning to consider regulating mercury emissions from the nation’s coal-fired power plants.

In anticipation of future regulations, the Federal government and industry funded research to characterize the emission and control of mercury compounds from the combustion of coal. Some estimates showed that 90% mercury reduction for utilities would be expensive for the industry because of the large volumes of gas to be treated, the relatively low mercury concentrations, and the difficulty of capturing certain species of mercury in its vapor phase.

With potential regulations rapidly approaching, it was important to concentrate efforts on the most mature retrofit control technologies. Injection of dry sorbents such as powdered activated carbon (PAC) into the flue gas and further collection of the sorbent by ESPs and fabric filters represented potentially the most cost-effective control technology for power plants.

The DOE realized the criticality of demonstrating and optimizing scale-up of sorbent injection technology to provide performance data for regulations. The DOE National Energy Technology Laboratory cost-shared these demonstrations, with additional funding from several power companies, the Electric Power Research Institute, and private ADA-ES funding.

The DOE-supported field tests resulted in great advances in technologies to capture mercury emissions and decreased costs. A 2005 report by the DOE Energy Information Administration concluded that because technology for 90% mercury control from Western (Powder River Basin) coals was not available, an overall 90% mercury control rule could cost \$358 billion. However, use of these new technologies later demonstrated that the 90% reduction for PRB coal could be achieved for less than \$1 billion per year. This saving represents a huge return on the investment made by the Federal government in supporting early development and demonstration of mercury control technology.

This success has allowed a dozen States to take mercury control into their own hands and implement stringent regulations on power plants in their respective states. This action has created the first real commercial market for the new mercury control technology.

Refined Coal Tax Credit (Section 45)

Tax incentives also play a vital role in achieving even further emission reductions. The 2004 American Jobs Creation Act included a production tax credit designed to incentivize clean coal at the front end—changing the way the coal burns—for older plants with limited resources or space to add back-end emission control. The tax credit was written with clear emissions reduction goals: 20% NO_x reduction and either 20% mercury or SO₂ reduction. An additional market value test, requiring that the product result in a 50% increase in market value over the feedstock coal still needs clarification (a baseline and enforcement guidelines), but the credit is significant in that it represents a strong goal-oriented, rather than specific technology-driven, tax incentive.

ADA responded to the incentive of the tax credit and assembled a team to apply our mercury control expertise to invest in technology development for a refined coal product that will allow older cyclone boilers to reduce mercury emissions by 90%—enough to meet stringent State regulations, simply by burning refined coal. Clarification on the market value test will allow us to move to full-scale demonstrations to optimize and deploy our refined coal technology, and realize the goals Congress intended by the legislation.

Clean Coal: Carbon Challenges

Carbon, in the form of carbon dioxide (CO₂), is a greenhouse gas that is believed to contribute to climate change. Our goal is to reduce CO₂ from both new and existing coal-fired power plants. This presents a number of challenges for technology development. It is not our purpose detail the technologies being advanced to address these issues. There will be a comprehensive report issued by the National Coal Council this summer that will provide in-depth background on the various approaches. At this point, I would like to briefly mention three key areas for technology development.

1) First, increased efficiency. The most effective way to quickly decrease carbon emissions is to increase efficiency of power production on new and existing boilers. Today we have more than 1,100 coal-fired boilers in the U.S. with an average age of 45 years. When many of these plants were built during the 1950's and 1960's, we did not care much about efficiency because coal was readily available, and cheap.

Figure 3 shows that we produce 25% less CO₂ as boiler efficiency increases from 35% to 50%. That is 25% less carbon that we have to separate and sequester. In May 2001, the National Coal Council produced a report which identified technologies that could increase the amount of electricity from the existing fleet of coal plants by 40,000 MW in a three-year period. Those recommendations remain viable today. To increase the amount of electricity generated by the existing fleet by 40,000 MW without the need to build a single new plant of any fuel type represents a tremendous greenhouse gas mitigation opportunity for this country.

However, although increased efficiencies result in lower CO₂/MW-hr, they also require higher /MW-hr. Currently there is no incentive to absorb the increased costs for reduced carbon dioxide emissions.

2) Carbon separation. Nitrogen comprises 78% of the flue gas from a coal-fired power plant. We have to separate the carbon from the nitrogen. Known technologies to do so include oxygen-fired combustion and amine (MEA) scrubbing for pulverized coal (PC) boilers, or chemical separation for integrated gasification combined cycle (IGCC) systems. The challenges now relate to scale and cost.

3) Carbon storage and sequestration. Once the carbon is separated, we must store, or sequester, it. Known technologies to do so include injection for enhanced oil recovery (representing only a small percent of CO₂), deep well injection, and deep ocean injection. The biggest challenges are the unknown long-term effects, which will determine long-term ownership and legal liabilities. Transportation of CO₂ from plants to storage sites will require very large and expensive infrastructure.

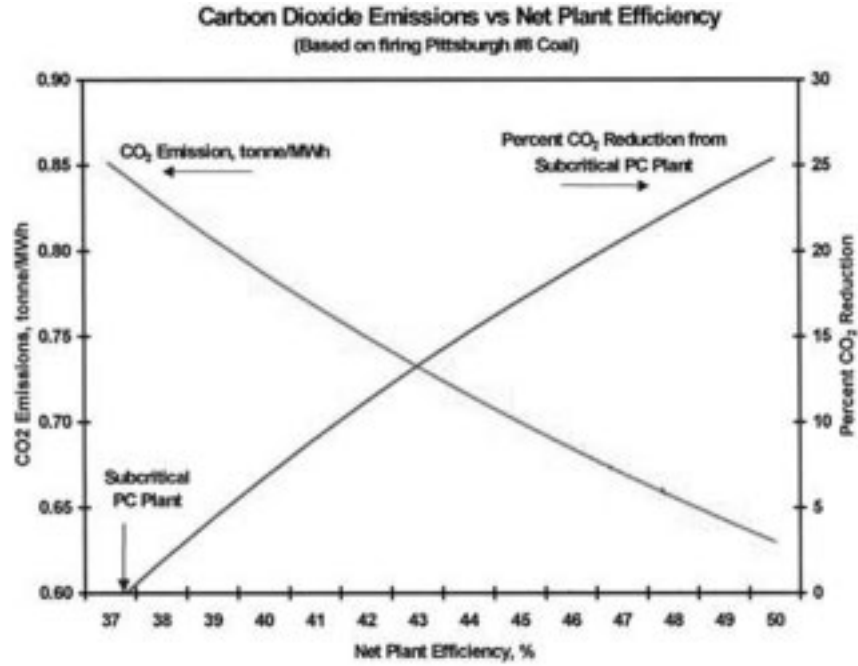


Figure 3. CO₂ emissions as a function of Net Plant Efficiency.

The Size of the CO₂ Problem

Carbon dioxide emissions from coal-fired power plants are bigger than anything we have ever tackled. The average 500MW plant produces 900,000 lbs of CO₂ per hour, and for a typical PC boiler, this CO₂ is highly diluted in the flue gas. Compare this amount of CO₂ to about 0.01 lbs of mercury per hour for the same plant. The scale for carbon capture and storage technology is daunting and the costs will be high.

Technology maturation for carbon capture and storage will take time. The technologies are in their infancy. However, based on advances to date, they will become available and less costly, within the next 20 years or sooner. Carbon capture and storage technologies can be expedited, but they cannot be willed into existence overnight by changes in policy. CO₂ emissions from the U.S. are only a fraction of the world's carbon emissions. Technology developed in the U.S., can be transferred to countries like China and India that will allow the U.S. to leverage its investment in technology development.

New Coal-fired Generation

Utilities are designing new coal-fired power plants to incorporate carbon separation and capture technologies as they become available. New coal plants will include both supercritical and ultra-supercritical PC boilers, as well as IGCC systems. They will incorporate the same carbon separation and storage technologies described above.

The Role of Carrots and Sticks in Encouraging Investment in Technology:

Not choosing a Winning Technology

Coal-fired electricity is cleaner today as a result of a balance between "Carrots" (e.g., government-funded technology development or tax incentives) and "Sticks" (e.g., government regulation or restrictions). You cannot impose the Stick until technologies are ready, or nearly ready, and you need the Carrots to ready the technologies.

In promulgating carrots and sticks, it is also important that the government defines a goal (e.g., reduced carbon emissions), but does not choose winning technologies. This notion is supported by most recent collaborative studies on reduced

carbon emissions. For example, the recent MIT Interdisciplinary study, "The Future of Coal," suggests that the government must not select specific technologies, but rather should incentivize technology development towards a common goal.

Timing is Critical: If we impose clean coal restrictions (e.g., in the form of carbon taxes or emission limits) before separation and storage technologies are available, electricity costs will spiral, unraveling our economy and our ability to afford new technologies. However, history has demonstrated that if we first incentivize technology development, provide for risk reduction, and carefully time restrictions, the market will develop and provide winning technologies.

Summary

Clean Coal is an important and viable part of our energy future. To move coal into a carbon-constrained world, we need to:

- Preserve base load electricity-generating capacity with reliable, inexpensive sources.
- Balance base-load capacity with renewable sources. Carefully balance timing between the carrots (tax credit and technology development funding) and the stick (e.g., regulations).
- Incentivize the achievement of goals, not specific technologies (i.e., we should reward any carbon reduction, not just the known technologies to do so).
- Encourage more technology development (R&D tax credits, demonstration tax credits, etc., and coordination with DOE R&D funding).

We need to invest now in tax incentives and support for technology development. We don't know enough, yet, to decide which technology will be most cost-effective for each particular facility. Following multiple paths will increase the likelihood of sufficient successful options for application in the future, and will not preclude out-of-the-box technologies that have not yet been envisioned.

We believe that based upon our past accomplishments, given sufficient resources and incentives, we can make Clean Coal a reality.

Thank you for your attention to this important National matter. We look forward to working with the Committee and the Congress in meeting the challenges ahead. We would be happy to provide any additional information, analysis, etc., that you or your staff require.

Chairman NEAL. Thank you. Mr. Gawell, I found your testimony on geothermal energy very informative. We have heard that short-term incentives mean the projects won't get off the ground, but you even cite specific examples where this has happened.

Could you detail your recommendation that any tax incentive include a longer placed-in-service allowance along with contract requirements?

Mr. GAWELL. The proposal, Mr. Chairman, made by MidAmerican Energy. Jonathan Weisgall, from MidAmerican, is my board president. They own a subsidiary, CalEnergy in California, that produces geothermal power.

Their situation was, they said, "We have got a huge investment here. I mean, geothermal renewable technologies are comparatively much more expensive. I have to take the risk, and I have to make it on the deadline, because if my plant comes online January 2, 2008, I get 0 of the tax credit." At least that's what my accountant is going to say. And their accountant said, "We can't take that risk, it's too much for us to go forward."

And what we have seen is people now don't build plants, they pull them back. What he proposed was he said, "If you could simply allow them the option that if we get that plant, we have our contract, we're selling to—let's say, in their case, you've got a firm power sales contract that says we're selling baseload power 24 hours a day."

Second, we've begun construction, which means in most of these firms, signed performance contracts for construction. So you're locked in. You're going to pay all the money, you're going to build the plant. You would, at your option, be able to use that date as the start date for your credit period.

Now, it may take you another year or two to actually get your plant built, and you would lose a year or two of the credit. But in their conditions, they said, "For us, this would make the difference. If we knew that, you know, if we missed the deadline a little bit, we will still get, you know, 80 percent of the current credit," they would have moved forward with the project. But otherwise, they just couldn't take the risk.

Now, to be honest, Mr. Chairman, some people will gamble. As you know, I used to work with the wind industry. And, you know, all these businesses, there is a lot of entrepreneurial people, and some people are going to take a gamble. But others won't. And others feel they have got a fiduciary responsibility with their board and tax—they can't do it.

And so, they recommended that that be allowed, if they're under construction and they've got a power sales agreement, that they could have their option, use the placed-in-service date as their start date, even though they might lose some of the credit. That would give them enough for them to move forward and say, "We will make the commitment and build the plant."

Chairman NEAL. Mr. Carlson, your testimony was very similar, regarding the length of time necessary for placed-in-service in biomass facilities. I am assuming you are in agreement with your colleague, Mr. Gawell.

Mr. CARLSON. Yes, I would be, Mr. Chairman. A typical biomass power project would take some three to four years to develop. And so, consequently, if an extension is not there for that period of time, a placed-in-service date definition change that would allow signed contracts to qualify would certainly be a benefit to our technology.

Chairman NEAL. The gentleman from New York, Mr. Reynolds.

Mr. REYNOLDS. I thank the Chairman. It has been a very enlightening hearing today. And, ironically, as I listen, fuel cells are a big aspect of parts of my district, as to an ethanol plant under construction in my district, as to the amount of wind underway in production, and solar in Buffalo, New York.

One of the things Chairman Neal and I were talking about is it seems that each of you talk about the fact that some of the tax credits that Congress has found in the time that you've filed an extension have not been long enough to look at doing the job for site determination, permitting, and construction.

It also seems evident in much of your testimony that without that tax credit, there will not be further advances in much of this type of energy consideration. Any in the panel disagree, that without the extension in 2008's expiring tax assistance, that we will be moving forward at full steam?

[No response.]

Mr. REYNOLDS. Hearing that, I would assume that Congress needs to consider its workmanship.

In coal, that old coal plant that is next to my district, with the promise where the state looked at five different sites and chose an old, traditional coal-burning plant for power, the condition was clean coal technology. And, of course, the message to Senator Schumer and Senator Clinton, to myself and Congresswoman Slaughter would be, "We are going to need a sizeable tax assistance in order to meet that."

But one of the things that I thought might be helpful, Doctor, in outlining to us is how coal plants today compare, in terms to emissions and efficiency, the older coal-fired power plants. Sometimes I think we have a tendency to draw what we know, versus what is beginning to get on the books, or under construction. And it might be helpful if you could address a little bit that furthers the aspect of what you outlined in testimony.

Ms. FRENCH. I think it is very instructive to look at where we have been with coal. Coal-fired power plants were mostly built in the 1940s, 1950s, and 1960s. These—the average age of our fleet of 1,100 boilers is 45 years old. Those boilers were not designed with particulate control, NO_x control, SO₂ control in mind. We didn't know about those kinds of pollutions then.

Since 1970, our electricity usage has increased 172 percent from coal alone. And yet, our NO_x, SO₂, and particulates continue to decrease. We have made tremendous strides. And much of this, as I said in my testimony, is retrofits.

But now, if you look at the world of a new coal-fired power plant, they are much, much cleaner than anything we can do right now, even. And they are state-of-the-art. Everything that is on the books right now is state-of-the-art for coal. And most of what is being designed is being designed with carbon capture and storage in mind. Does that answer your question?

Mr. REYNOLDS. Yes. One other question I might have. Does the marketplace already provide sufficient enough incentives for companies to develop and deploy clean coal technology? And if not, what incentives would be appropriate to encourage—

Ms. FRENCH. I think the incentives for mercury control are coming. They are there in several states that have mandated their own mercury reduction rules that are more stringent than the Clean Air Mercury Act. And it's those regulations alone that will bring mercury control down to the levels it is capable of now. I don't think there are any more incentives, besides regulations, required there.

The incentives for carbon are different. Incentives for CO₂ are two, as I said. The first is you need to incentivize higher efficiency plants. If I am going to build a plant right now, you want me to build the most efficient plant I can, because then I make less carbon for each megawatt of electricity that I produce.

But my—a higher efficiency plant is going to cost more. And if I have to sell that electricity for more, electricity is electricity. It's the same, no matter if it's a high efficiency plant or an old, dirty plant.

So, what we need to do right now is incentivize high-efficiency, new coal plants. That's the first place to start. If I can take efficiency from the high thirties, where we are now, to almost 50 percent, I produce 25 percent less CO₂. That is 25 percent less CO₂.

that I have to capture and store, or deal with. And that is really the place to start.

The carbon technologies themselves are in their infancy. And I think we need to incentivize the research and development. But as I said, we have to time the regulations with the technology development. So we need massive investments in research and development to get there, which I think we can, but we need to start now.

Mr. REYNOLDS. All right. Thank you, Mr. Chairman.

Chairman NEAL. The gentleman from Washington, Mr. McDermott, will inquire.

Mr. MCDERMOTT. Thank you, Mr. Chairman. I appreciate you having this hearing, and opening up a subject that hasn't been opened in Congress since 1993. That's the last time we had a green amendment before this Committee. Sakowski said to me 1 day, "Get some green amendments. I don't know what they are, but see if you can get some."

[Laughter.]

Mr. MCDERMOTT. And we started in 1993, went a few years, and then we were leading the world and we dropped it. The Danes now produce. Wherever you go you would find a Danish turbine doing the job. That's because the Congress, for the last 12 years, has not paid attention to this issue.

Now, one of the things that troubles me in listening to this—and I look at the people here at the table, and I see the 800-pound gorilla that is not at the table, which is energy conservation. I would like to hear you folks talk about how we should allocate a certain amount of tax credits we're going to have, keeping in mind that for every watt we save we don't have to build another one.

And how do we make those decisions? Why should we choose wind or solar or coal—clean coal, if there is such a thing—over not building? Because Americans have had this long history of showing that we're a rich nation by wasting. You go down any major city in the United States, when you look up in the buildings, all the lights are on, and we are wasting energy all the time.

And it seems to me that there ought to be some kind of decision made in this Congress about what we do about tax credits and incentives that have to do with energy conservation. And I would like to hear you people talk about it. I know it's not what you came to talk about. You came here selling your particular version of the way to go for the future.

But let's talk realistically. We don't have all the money in the world. So if anyone wants to talk, I am glad to listen.

Mr. DINNEEN. I will start, Congressman. Other people will want to join in, but I think at least for us, we certainly agree that conservation needs to be part of the energy answer.

We have a big job ahead of us. And I think all the renewables, other alternatives, and conservation, has to be part of any sane energy policy moving forward.

I would say with particular respect to ethanol, because ethanol today is a—we do hope to be able to utilize a lot more flexible fuel vehicles that are running on E85, like the one I did drive to this hearing today. It's not the most efficient technology. It doesn't really take advantage of the fuel qualities that ethanol could provide, and there is a 30-percent reduction in mileage when ethanol is

used, which makes the economics that much more difficult. But it also says something about the energy efficiency.

And I would hope that in working with the auto companies as well, that there are incentives in place for them to maximize the efficiency of those flexible fuel technology vehicles. So I certainly agree that that is problematic, sir.

Mr. RESCH. Congressman, if I may, I think they absolutely go together, energy efficiency and renewable energy. And I would hate to get into a thing where it's either/or, because I truly think we need both if we're going to get serious about being carbon smart as an economy, if we're going to be serious about scaling up manufacturing, and if we're going to be serious about actually leveling energy prices for consumers.

When I installed the system on my house, I installed it to be 80 percent of our electricity load, and I put pressure on the family to come up with the other 20 percent. So we put in compact fluorescents, we improved the energy efficiency, using, you know, basic, off-the-shelf measures, but we were able to drop it down by 20 percent, and see some real-time performance. And now the system actually does generate 100 percent.

So, that's a good example of how the two go together. And I would hate for Congress to say, you know, "We only have so much money, we can only do one or the other." We need to make a fundamental transformation in the way energy consumers both understand energy, deal with energy, and move forward decisions on energy.

And I mean, one of the things that I am most, I guess, frustrated by is the fact that most people don't understand where energy comes from, electricity, or even natural gas. And you know, there needs to be an education there. And I think the one thing that sends the biggest signal is when Congress says, "I am empowering you to go change your lifestyle. I am giving you a credit to go improve your energy efficiency, or to put on solar," or whatever it happens to be.

Mr. MCDERMOTT. I think the reason is I just bought some appliances for a remodel of my house. And if you get that star on there, you get some money back, and there is a lot of stuff.

It seems to me that that's a very important place that we should be putting some of our tax credits. They shouldn't all be in the direction of the creation of more energy, but rather the creation of clean energy. Because I suspect that all utilities are operating on some kind of 10 percent or 20 percent growth per year, as we have done since 1950. I mean, I was in the State Legislature in the State of Washington when we put together—so I know about nuclear energy, and what they told us about how it was going to cost—we built a bank with that kind of stuff.

So, I really—the conservation question really is one that I wonder about in building construction. Mr. Weller and I have a bill on building construction and post-construction, and I wonder about how much of that we should put in. Mr.—yes?

Mr. GAWELL. Mr. McDermott, I think, first of all, let me point out that most of us here also are part of a group called the Sustainable Energy Coalition, because we do support both.

And we realize—well, frankly, when you look at the issues we—I can't tell you how many phone calls I get on climate change. I'm sure you do, too. I mean, how do you address some of these big issues? I think you're going to probably need a little bit of everything to even stand a good chance to get the kind of reductions you need.

But I don't think it's fair to assume all the utilities are looking at growth—at least not in the West. I mean, in California, they aren't. They are looking at a fairly aggressive piece of legislation that is going to push carbon reduction and set a model, hopefully, for the country, on how to do that.

But even when you're looking at the California model, you still need to be replacing—I mean, the point made about clean coal is true. Our fleet, even for the power we need, is getting quite old. We have a lot of central station problems, we have a lot of peaking problems. You are going to use both.

It's infinite wisdom to figure out which. I mean, I could tell you during the 1992 energy bill I used to work in the Senate. And of all people, we would have these discussions in the back room with Senator Paul Wellstone and Senator Malcom Wallop. We would both sit there, going, "Well, how do we know any of this stuff really works? How do we know what drives that marginal dollar of investment?"

And it is tough. I mean, everybody—you know, when we had the hearings back in 1992, we sort of had—I said we had the level playingfield hearings. Every witness, every technology, every interest group came in and had their thing they wanted, and it was all for the level playingfield.

But it's tough to see, but I will say the one thing about the renewable production tax credit is I think it does demonstrate that it works. It has shown that, unfortunately, when it is not there, things start cramping down very quickly.

So, I think you do need a mix. I think we all support that. But I think we also all want to see results. I think if you want to give tax credits that show you they are driving real investment in all these things, and somehow try to factor that into your policies, would make a lot of sense.

Chairman NEAL. Thank you. The gentleman from Georgia, Mr. Linder.

Mr. MCDERMOTT. One thing. I hope that at some point we can talk about public power and the whole Production Tax Credit, and what the 15 percent of power that's created by them, how they get into this when it's basically been set up for the private sector.

Chairman NEAL. I appreciate the gentleman's line of questioning. The gentleman from Georgia, Mr. Linder.

Mr. LINDER. I thank the gentleman. Mr. Dinneen, when you take all the renewable fuels put together—solar, biomass, et cetera—what percentage is the total energy output?

Mr. DINNEEN. I am not sure what—maybe somebody else? About two percent?

Mr. LINDER. About 2 percent? Mr. Resch, you said your solar product produces about 1/30th of 1 percent of all the energy needs. What is your 30-year goal or 20-year goal? What do you think you can get?

Mr. RESCH. It depends a little bit on the tax incentives, of course, but we estimate that if you have an eight-year extension of the tax credit—we did in that timeframe—solar, by the end of that tax credit, will be providing 50 percent of all new generating capacity. Right?

So, we recognized that if demand for energy is going up like this, and we have to build new power plants, by the end of that 10-year window, solar will be providing 50 percent of that growth. So, as we go forward, solar becomes an important part of the mix. And at the end, we're still small, because we're competing in a very, very large, you know, 40 or 50-year installed capacity. We will end up being about—

Ms. FRENCH. It's 50 percent, yes.

Mr. RESCH. Yes, so we will be about three percent, growing to five percent shortly thereafter. Up to 30 years, it could be significantly larger.

Mr. LINDER. Mr. Rose, you said that fuel cells cost \$3,000 per kilowatt. Is that what you said?

Mr. ROSE. Congressman, fuel cells are a family of technologies, and they are being developed for just an extraordinarily wide range of applications. I can't give you a single number for the cost of a fuel cell, but it's—some power generation systems do charge—or do cost in that range, yes. Others are more expensive.

Mr. LINDER. What is nuclear cost per kilowatt? Do you have an idea?

Mr. ROSE. I don't. It's not my field.

Mr. LINDER. Anybody have an idea?

[No response.]

Mr. LINDER. What does coal cost per kilowatt?

Ms. FRENCH. I don't know, but I can find out.

Mr. LINDER. I would like to know.

Ms. FRENCH. I will do that.

Mr. LINDER. Mr. Dinneen, you said that ethanol and its industry puts \$2.7 billion into the revenue stream. Is that right?

Mr. DINNEEN. That's correct.

Mr. LINDER. How much does it take out? Is that a net number or a gross number?

Mr. DINNEEN. That would be a gross number.

Mr. LINDER. How much does it take out?

Mr. DINNEEN. \$2.5 billion is the cost of the tax incentive last year.

Mr. LINDER. How much per gallon of ethanol is subsidized by the taxpayers?

Mr. DINNEEN. Well, they get an incentive for every gallon of ethanol they use, to the tune of \$.51 a gallon, so the—

Mr. LINDER. Taxpayers get \$.51 for every gallon?

Mr. DINNEEN. Well, the taxpayers are receiving about \$4 back, because of the reductions in farm program costs I talked about, and the increased economic activity associated with ethanol production.

Mr. LINDER. Mr. Steve, you said that farmers make \$5,000 per month you said?

Mr. STEVE. Land owners, farmers, ranchers make about \$5,000 in payments per wind turbine per year.

Mr. LINDER. Per year.

Mr. STEVE. For a period of 20 years.

Mr. LINDER. Do you know what—how much it is per kilowatt?

Mr. STEVE. Per kilowatt? No, I don't have that calculation. I can get it for you, though. But I can tell you that we do hear stories from folks who say, "This allows me to put my kid through college. This allows me to keep farming, where I couldn't farm before." It is very helpful for—

Mr. LINDER. Do any of you represent a product that can succeed commercially without a taxpayer subsidy?

Mr. ROSE. May I? This is my opinion, and not my organization's opinion, but I think they—the Members—would share it.

The answer is yes. I think what would happen is—well, in fact, fuel cells are competing in markets today. There are niche markets, relatively small markets. And what we are looking at with the—

Mr. LINDER. Are they commercially reasonable?

Mr. ROSE. I'm sorry.

Mr. LINDER. Are they commercially reasonable?

Mr. ROSE. They are being purchased in preference to other technologies that are on the marketplace, so I would say yes.

But what we're talking here is, first, accelerating the transition to wider adoption of the technology. I mean, there is a public value in that transition, or we wouldn't be here. And I think that is—it isn't so much the cost, it's the value that's extracted, I think, from all of these technologies for the larger community.

And fuel cells can't compete in the marketplace in some markets today, and will find other markets. But they will not move into markets, as many markets, nor will they move into those markets as fast, without the support of the taxpayers.

Mr. LINDER. Good.

Mr. RESCH. It's kind of interesting to point out that every satellite that has gone into space in the last 30 years has been solar powered. The largest consumer for solar energy, for years, was the oil and gas industry, and they used solar remote applications to power pumps and meters and telecommunications equipment.

You walk down K Street, you're going to see parking meters that are solar powered. The reason why is in remote applications. It's going to cost you a lot more to run a power line out to that unit, versus buying a solar system. So in a very small niche market like Bob is describing, solar certainly is cost-effective, and we are seeing it in wider and wider uses. I have seen cities that have air quality specifications, and so they are turning to solar, or other non-polluting technologies to generate electricity.

Mr. GAWELL. Mr. Linder, I just want to add, I think it—for some of the technologies, like geothermal, we're not just a technology, we are also a resource akin to oil and gas.

So, there are some areas where people develop pretty economically, but those are the cherries. But then you get out to larger areas that cost more and more, and you have got to have a push to get there through an incentive, or you've got to have major technology development.

So, we're not exactly a widget with one price. We're a resource base with a range of prices, depending on what you look at.

But I want to also point out that there was a study done by Dallas Burtraw of Resources for the Future, and he actually looked at

all the renewable technologies and what happened to them. What happened to their prices between 1978 and 1990? And what he found was that every technology here met their price reduction goals during that period when we were building power plants. But the other thing that happened was during that same period, the average price of electricity from "conventional sources" dropped 40 percent.

So, while many of the technologies did get their cost reductions, effectively the goal line moved at the same time. So these are fairly dynamic factors. And I think each technology has certain aspects. Even with wind, there are different wind regimes. Some wind regimes you're going to get different economic factors than others.

So, you build out over time. If you want to get to this large end, we need to be building plants forward. Are we commercial in some areas? You might get commercial product. Most of those have been built, where you start moving up that supply curve.

Mr. CARLSON. The largest user and producer of energy, also the most heavily integrated user of their own internal energy resources—55 percent of all the energy used by the forest products industry in the U.S. is produced internally.

And so there are—just like the others have said, there are certain markets like that. For instance, if you're producing electricity for your own internal use, such as a pulp and paper facility, you're able to essentially sell it at retail.

But what we're talking about is trying to move this technology out into the mainstream, so that we can utilize more of those underutilized biomass resources, where someone else may not already have paid the cost to collect them, move them to a central location, as you will in a manufacturing facility.

And can we make the leap to selling it wholesale today? In most of the markets, the answer is, "No." But all those internal resources have been used for many years to make a highly integrated forest products industry that has very well utilized the less expensive resources to produce internally.

Mr. LINDER. What is the most efficient biomass technology, in terms of producing enough power to sell off, versus what it uses to produce the power?

Mr. CARLSON. In a stand-alone new facility, that facility will sell 90 percent of its output externally, about 91 percent.

Mr. LINDER. That's about twice what it was 10 years ago.

Mr. CARLSON. It is—internally, yes. The uses have gone down substantially. And so we are not efficient technology, because of fuel—very low Btu and very high moisture. So you wouldn't call it—they can't compete with the numbers that the doctor gave for coal, as an example.

But that efficiency has come up, and—but it is still at the low 20 percent range, on an overall efficiency basis.

Mr. LINDER. Thank you all.

Chairman NEAL. I think Mr. Dinneen would just like to—has a brief comment.

Mr. DINNEEN. Real brief. Congressman Linder, the ethanol industry is thrilled to be able to produce six billion gallons this year and we're going to double in size in a couple of years, but we're still

selling into the 140 billion or 150 billion gallon gasoline market. And our customer is our competitor.

And so, there is no real incentive for them to, you know, turn over a part of their gallon to us, in the absence of the tax incentives that Congress has put in place. As we continue to grow, and we get much more volume—and you’re producing ethanol from cellulose and other feed stocks—you may then have the volume where tax incentives are not necessary, because we will be a more meaningful part of the marketplace.

Chairman NEAL. Thank you, Mr. Dinneen.

Ms. FRENCH. Can I make one very brief comment, similarly?

Chairman NEAL. Thank you.

Ms. FRENCH. I don’t think that clean coal requires subsidies. I think we need to incentivize the technology development. And during that time, what you will see is you will see the cost of those clean coal technologies decrease, which is really the same thing the whole panel is saying. The costs will decrease, the reliability will increase. And it creates a market for these clean technologies. And that is very different than a subsidy.

Chairman NEAL. Thank you. And, Dr. French, your comments on the cost of coal per kilowatt will also be made part of the record.

Ms. FRENCH. I will—

Chairman NEAL. Thank you. The gentleman from Connecticut, Mr. Larson, will inquire.

Mr. LARSON. Thank you, Mr. Chairman, and I thank the panel for your expert testimony. And I just want to thank Mr. Rose for pointing out that Connecticut is, indeed, the center of fuel cell excellence, led by UTC Power, which does an extraordinary job, trying to compete with Mr. Reynolds on a regular basis to maintain the fuel cell world.

I decided to point out quickly, because I ask a couple of questions, that the greatest subsidy taxpayers currently pay is the amount of money that we export abroad to foreign companies who are utilizing oil.

And I think as Thomas Friedman points out, our current foreign policy is, essentially, “Leave no moolah behind,” because we find ourselves in a situation where we are not only exporting more than \$200 billion annually abroad, but that money finds its way into—it ends up funding terrorists and Islamic extremists who are fighting our troops over there, where we are currently spending over \$400 billion in the war in Iraq.

And so, this, in so many respects, is not only a tax situation, this is more of a national security. I want to commend Speaker Pelosi and Chairman Markey for the hearing the other day that is simpatico, Mr. Chairman, with your concerns to making sure that we get after the need to provide energy independence and the whole concept of global warming. There was a hearing in which we had both admirals and generals testifying, and talking about the need for us to make this transition.

My two questions are as follows. First, it’s one that is a bit self-serving, but the focus today is on renewables, and yet often time in renewables we don’t focus on emissions. And so, Mr. Rose, I will start with you and ask don’t you think that that should be included as part of the standards? That, ultimately, if we are trying to re-

duce the carbon footprint, that we ought to, when we're awarding and deciding and providing tax incentives, that we ought to make sure that emissions is as important as something being renewable?

Mr. ROSE. Well, I believe I'm required to say "yes," Congressman.

[Laughter.]

Mr. ROSE. And, therefore, I will. The—I am fond of saying, as you know, that it's really a combination of benefits that fuel cells—and, indeed, some of our colleague technologies—bring that really make the difference.

And we have three problems. We have the problem that you have described. We have the other problem of smog, and the need to protect public health against the ravages of air pollution. And we also have an energy security problem. And it's not a cafeteria plan, you know. We have to address all of those in order to really achieve the kind of future we all hope.

And so, therefore, I am not sure that anybody has succeeded in monetizing those kinds of benefits in the past. It certainly is an area where we think we deliver the goods——

Mr. LARSON. I am going to assume that most of the panel is—agrees with that. But I—if there is someone who doesn't, you've got the mic.

[No response.]

Mr. LARSON. Since everyone agrees with that, let me move on to my second question. In an article over this weekend, Thomas Friedman very succinctly laid out what he sees as the problem. In fact, he looked at it from an entrepreneurial standpoint—something my dear friend and colleague, Mr. Blumenauer, has been exploring for years. And I want to proceed along the same lines that Mr. McDermott did, in terms of asking a question that's a little bit outside of the box.

Essentially, he ends this whole story line about talking about the green—American importance as it relates to national security and reducing the carbon footprint by saying, "All talk in conversation about this is pointless, unless American citizens, unless the entrepreneurs, Members of government, including Congress, are willing to step up to the plate and face, head on, the issue of a cap in trade, and more importantly, a carbon tax." Do you agree with that, yes or no?

Mr. RESCH. Yes.

Mr. LARSON. Well, let's take—I guess I will start with you.

Ms. FRENCH. I think it is very, very important to look at the timing of that. If we unravel our economy by sending electricity prices sky high—I'm talking about the baseload——

Mr. LARSON. Even if some of the tax funds went directly to achieving some of the goals—the boilers that you laid out earlier, and tried to provide the incentives for you to so-call "get at" clean coal?

Ms. FRENCH. Yes. I think we can get there, but I think we have to look very, very——

Mr. LARSON. So when, in your estimation, would that be?

Ms. FRENCH. I don't know, because the technologies are not——

Mr. LARSON. You don't know.

Ms. FRENCH [continuing]. Available yet. But if you put the stick in place with no technologies, there is nothing to support—

Mr. LARSON. So Friedman has got it wrong.

Ms. FRENCH. No. I think he doesn't—I'm not saying not to do it, but I am saying that we have, in this country, an environmental agenda because we have a strong economy. If we take the meat out of our strong economy by sending electricity prices sky high, we won't have an environmental agenda.

The poor countries don't have an environmental agenda; they can't afford to. We can. But we have to act cautiously. And I think those answers—those questions are excellent questions, but I don't think we have the answer right now.

Mr. LARSON. So the answer is we don't have the answer?

Ms. FRENCH. We don't have the technologies right now. The answer is we need to invest in technologies—

Mr. LARSON. None of these technologies will help, here?

Ms. FRENCH. They won't cover the baseload. They won't cover the foundation of our economy right now. They are very, very important. As everybody has said, we need a mixture of technologies.

Mr. LARSON. Would the other panelists respond?

Mr. STEVE. Mr. Larson, we could use significantly more. These technologies offer great promise to this country. We are not going to claim that we can run the entire country on any single technology, that's true—of base line technologies that we have already. You need a mix of resources.

What we are saying is give us the tools, give us a long-term credit, we will get out there and we will build more. We will create more jobs. We can do it.

Mr. RESCH. Congressman, your point is a very good one, and I would say, from a solar industry perspective, regardless of what the structure is, we would want to make sure that there is a clear market signal that is coming from this, all right?

So, if it's a Btu tax, or if it's a carbon tax, whatever it happens to be, what you're then providing to consumers and to industry is a clear market signal. It's not a stick, it's a market signal that allows, as Mr. McDermott talked about, energy efficiency.

All of the sudden, your first choice is energy efficiency, and consumers, if you're paying more for electricity, guess what? You're going to do that first. Second thing you are—

Mr. LARSON. Combine that, as he said, with conservation?

Mr. RESCH. Conservation, efficiency—

Mr. LARSON. Keep your limits that you're looking at, or more?

Mr. RESCH. And then I think you have got a true energy revolution in this country that hasn't occurred since, literally, electricity was invented and then went mainstream, back in the 20th century.

Mr. ROSE. May I also comment—

Mr. LARSON. Mr. Chairman, I think my —

Chairman NEAL. Well, let's choose this time to push forward. There is only one vote, and what I would like to do is to run over and vote. Mr. Larson can take the chair and I will come right back so we can continue the hearing. So Mr. Larson can control the time. Continue.

Mr. ROSE. The Congressman knows the kind of answer he is going to get from me, I think. I do want to say that, seriously on

this point, it's an important point for our industry, and I believe for sustainable technologies, generally.

Any program, whether it be a tax program, or a so-called cap in trade program, has got to recognize that a lot of our technologies are making this transition a few kilowatts or a few hundreds of kilowatts at a time. And the challenge with programs like cap in trades is that they tend to go after the big guys.

And so, any program that is developed, I hope, will recognize that these kind of small-scale, distributed technologies—

Mr. LARSON [Presiding]. Mr. Rose, I would, because of the shortness of time, and my dear friend and colleague has to be on the floor—

Mr. ROSE. Oh, sure.

Mr. LARSON. So I am going to yield to Mr. Blumenauer for more—he has an amendment on the floor, and will not be able to come back.

Mr. BLUMENAUER. Thank you. I appreciate your being here. I have three questions—two that I would just offer, and seek you to provide this information when you have a chance.

I was—Mr. Linder's point about the subsidies that you all enjoy, and are seeking to make more use of, I just wondered if you, from your perspectives, could offer a brief assessment of the subsidies that all the sources of energy enjoy. To the best of my knowledge, there is no source of energy that hasn't enjoyed massive subsidy at some point, and continuing.

Some of my friends in alternative energy have—when I can pose these questions, they say, well, they would be happy to settle for what the subsidy has been for the petroleum industry for a short period of its history, but the cost of—I appreciate what Mr. Larson talked about, in terms of what the cost of a gallon of oil would be if we factored in our investment in the Middle East to secure lines of supply and the vulnerability that we heard about at our hearing—a fascinating hearing—yesterday from the defense experts.

So, if you could, at your leisure—but some time sooner, rather than later—give us a sense, from your perspective, of the subsidization of energy in this country, past and current, and how your niche fits into that.

My second question, again, at your leisure, would be directly related to that, how we rationalize where we go from here. I am absolutely convinced that you need a reasonable window, not rolling the dice, is it going to expire in two years, is it go again in three? Some are different from geothermal, different for ethanol.

I, personally, am interested in both of these Committees that Mr. Larson and I serve on, to be able to rationalize this in a way that people know what they expect, that there is always, you know, maybe a three-year window, that there is a rolling expiration date, things of that nature. If you could help us think about how it could be rationalized, in terms of structure and amount.

My specific question, if any of you have anything off the top of your head that you would wish to respond to, I want to know what the Federal government can do now to exploit, enhance, and develop the markets for the technologies that you have right now.

A specific example. The Department of Defense is seeking \$22 million for a diesel generator for Guantanamo. Fuel that has to be

brought in, huge sums of money, for just the prison facility. Any of you think that there are applications that might reduce that part of the carbon footprint, whether it's the Department of Defense, Interior, Transportation, the GSA, or the 300 million square feet of office space that we have across—can you give us some thoughts about what the Federal government can do right now in the budget in a cost-effective way to promote what we're talking about?

Mr. LARSON. I think we can do that in a minute and 16 seconds, but—

Mr. BLUMENAUER. I do, a very quick answer. And then there is one quick one that is probably outside the purview of this panel, in particular, is a Federal purchase requirement for renewables.

We, the Federal government, will lead by example, purchase X percent—say 15 percent—of power through renewable resources at all times. Currently, the Air Force is purchasing wind power, and they were a purchaser of wind power, as well. This can be done.

Mr. STEVE. We have a—

Mr. LARSON. As the panelists are, I'm sure, aware, we have a vote that is currently going on. It's the Chair's intention to ask Mr. Weller to speak, and then we will briefly recess and come back and finish the hearing. But I just wanted to thank my colleagues for their forbearance. And with that, we will turn to the gentleman from Illinois.

Mr. WELLER. Well, thank you, Mr. Chairman, and thank you for including me in this hearing. I am a Member of the full Committee, but not a Member of this Subcommittee, and I am pleased to be here to see a number of folks that I had the opportunity to work with on what I believe has been good policy over the last few years.

Particularly, as I look back over the last 12—now more than 12—years of the Ways and Means Committee, I think one of our proudest moments was about 2½ years ago, when President Bush signed into law the Energy Policy Act of 2005. A good policy that promoted alternative fuels, emphasized energy.

And one common theme I am hearing today is that the extension for a significant, long, period of time for provisions before this Subcommittee and this hearing today, because good policies work. And I have seen that in my district, because we encourage more power plant—Transco, a small manufacturer in my district, has gone from 40 to 120 employees supplying the insulation for power plants. Hundreds of millions of dollars in wind energy investment.

With all the glacial—in my district we have glaciers in it, the higher point of ground, a positive place to build wind farms. We have six, either in operation or in construction.

Biofuels, with the more than doubling of biofuel uses in the energy bill that President Bush signed into law in 2005, I participated in ground breaking for the 300 million gallon biodiesel plant in Seneca, Illinois. That would be the largest biodiesel plant in the world. Presently under construction is a 100 million gallon plant going through the permitting process in my district.

So, clearly, in this case, the rural areas in my district are big winners when it comes to that kind of development and investment. So the good policies in the energy bill of 2005 is working.

And my friend, Mr. McDermott, noted a bill that he and I are working on to extend the energy efficiency provisions that were in the 2005 energy bill. I offered a residential tax credit with others on the commercial building tax credit. Energy efficiency must be part of our policy, as we continue to move forward. And I advocate long-term extension.

I am also, you know, Mr. Chairman, an advocate of the 25x'25 proposal, and it kind of all sounds outdated. I am clearly not—you can listen to the rhetoric out there, but if we were to provide—produce 25 billion gallons of biofuels, we would eliminate Venezuela as a supplier of oil and gas to the United States. Think about that, what that would mean in the foreign policy arena, and what it would mean to the national security concerns of this country.

And Mr. Dinneen, you mentioned you drove to this hearing today, or drove to work today, in a flexible fuel vehicle. There is a new technology out there called a hybrid flexible fuel technology. Two U.S. manufacturers, Ford and GM, are moving forward to introduce that in the marketplace. Other manufacturers are moving forward in that. That marries the hybrid technology with flex fuel technology. So you have the hybrid engine plus the E85 capability.

And it is said, according to an economic analysis, that if 5 percent of all the vehicles in America were hybrid flex fuel vehicles, we would eliminate 140 million barrels of imported barrels a year. Think about what that would mean to our National security, let alone our economy, if we could do that.

I have legislation I will discuss with the Senate Committee next week that provides a \$3,500 tax credit to purchasers of a hybrid flex fuel vehicle. Kind of mirrors the incentive we had in place for the hybrid, which worked to create that marketplace, and—

Mr. LARSON. I don't mean to interrupt the gentleman from Illinois, but there is about—just more than a minute-and-a-half to—

Mr. WELLER. Well, very quickly—

Mr. LARSON. We have to get over and vote, which—

Mr. WELLER [continuing]. Look at that type of incentive, as you talk about promoting flex fuels?

Mr. DINNEEN. I think it would be extraordinarily helpful to move that technology forward. A flexible fuel hybrid, as far as I understand, would get about 700 miles to the gallon of gasoline that would be used. So it is absolutely something that we need to be looking very closely at, and I appreciate your leadership on that.

Mr. BLUMENAUER. Seven hundred miles to the gallon. Think about that.

Would you also submit to the Subcommittee, for the record in a written form, discussion of the potential for alternative sources of biomass—

Mr. LARSON. Without objection, that will be made part of the record. And we will recess. When we come back, we will still continue with you up here, and I apologize for the fact that we had to vote for the second vote. We will stand in recess, but we will be back.

[Recess.]

Ms. SCHWARTZ [Presiding]. We will gather again. Mr. English is recognized for five minutes.

Mr. ENGLISH. I want to thank the Chair for the opportunity. And I must say, although I was held up on the floor, I found out I was going to be a participator in this hearing. I have been very impressed by the testimony that I have read.

And my first question is to Dr. French. Reading your testimony, the question that arises is does coal and liquid technology hold the promise of making the United States independent at some threshold from imports of foreign sources of oil? And if so, what carbon sequestration challenges would exist in a coal and liquid—

Ms. FRENCH. Mr. English, thank you for the question. I am not an expert on coal-to-liquid. My background is combustion. So, let me speak from the environmental background, my combustion background, and recognize that I am not the country's expert on coal-to-liquids.

I think that there is no question that coal, as a transportation fuel, as a liquid transportation fuel, holds a big role in national security, reducing our dependence on foreign imported oil. I don't know enough about the numbers to say that—you said a threshold—couldn't become independent. I don't know the numbers.

In terms of the carbon from coal-to-liquids, I imagine you're talking about the carbon in the process of making a liquid fuel from coal, compared to the process of making a liquid fuel from crude oil. Is that correct?

Mr. ENGLISH. Yes.

Ms. FRENCH. Okay, so we're talking the process itself. And, again, I am not an expert on this. The carbon capture and storage technologies for that process will be very similar to the carbon storage capture technology through higher carbon production.

So, I believe, as I said before, those are within our realm. We have a lot of smart people working on this. The technologies are in infancy now, but there are some very promising concepts on the table.

Mr. ENGLISH. Beyond that point, Dr. French, in your view, does the marketplace already provide sufficient incentives for companies to develop and deploy clean coal technologies? And if not, what other incentives are appropriate to encourage this activity?

Ms. FRENCH. Yes, Mr. English. I answered a portion of this question before. I think the incentives for clean coal, as up to and including mercury, exist already. The mercury control, as I stated in my oral testimony, is driven by regulations. The regulations exist in several states that go beyond the Federal mercury rule, and that has incentivized mercury control technology, and that is now commercially available for 90 percent mercury reduction.

When we look at clean coal as it relates to CO₂ capture, there are two parts to that. The first part is incentivizing efficiency. We want to incentivize the companies building new coal-fired power plants. And to some degree, part of the existing fleet. We want to incentivize efficiency. If we can move efficiency from 37, 39 percent, where we are now, up to closer to 50 percent, we reduce carbon by 25 percent. That is the place to start. That is 25 percent less carbon that I have to capture and store.

And those technologies exist right now, but we need—there is no incentive to pay more for a power plant that is more efficient. So we need to incentivize efficiency, as a first step.

And the second step is actually carbon capture and storage. Those technologies are in infancy. They require massive investment in research and development, and they require careful timing between the regulations and the technologies. We oppose regulations before the technologies are ready.

Mr. ENGLISH. Thank you, Dr. French. Mr. Steve, I am somewhat familiar with what has been happening with wind power, in part because I have a major employer, GE, which is involved in the business, and I have been particularly struck by the technological changes that have gone on within wind power that seem to be telescoping its potential.

I wonder if we could talk briefly about how technological changes that at one point were being pioneered in Europe are now ripening within the United States, and whether the extension, particularly of the tax incentives we're talking about, are going to encourage technological innovation.

Mr. STEVE. Certainly. I will talk briefly, as well. Essentially, today's wind turbines are quite high-tech. The blades turn—they're computerized to turn into the wind. Very high-tech.

What we need out of a long-term extension of the credit is actually something that will help us on the low-tech side, believe it or not, which is GE, for example, who, with all the resources they have, have a very difficult—they build wind turbines, but they have a very difficult time ironing out their supply chain, because people don't want to build things on an off again, on again basis every other year.

We are talking about large components, like the castings used that hold the—essentially, the guts of the machine at the top. They hold the generator at the top of the machine. Folks don't want to hire people every other year. So you can't get enough people to do the production that is possible. That's why we need that long-term credit, is it—so that we can ramp up production.

Mr. ENGLISH. Well, that makes a lot of sense, Mr. Steve, because the people in my district, on balance, would prefer not to be hired every other year.

[Laughter.]

Mr. ENGLISH. I yield back the balance of my time.

Chairman NEAL [Presiding]. Including the gentleman from Pennsylvania.

The gentlelady from Pennsylvania, Ms. Schwartz, is recognized.

Ms. SCHWARTZ. Okay, thank you, Mr. Chairman. I appreciated your testimony. And before I ask my question, I want to associate myself with comments made earlier on conservation, and about the importance of—we really have to reduce the—well, individuals and businesses, as we ramp up and promote more production. We need to produce more, but we also don't want to end up with so much excess. We want to be conserving energy.

I also wanted to mention something that has not been talked very much about. I will just mention—it's not exactly germane, but we talked very little about public transportation. And here, too, there may be technologies that would go into public transportation. I come from an area that may—Mr. Blumenauer isn't here, but my guess is that he would be more expressive.

So, it would be interesting if there are other options we can discuss today.

What I wanted to ask you about was if you could—we touched on this earlier—the standards that have been set by 23 states, have really had as dramatic, or possibly more dramatic an effect, than some of the tax incentives that we have created, and when we speak to the states moving ahead of us at the national level in creating that market for you, and really creating those standards.

So, how much—can you actually talk about the mix of—whether setting those standards has had more of an impact than the tax credits? And sort of a follow-up, what do you think about a national standard, and whether that actually would do more for engaging private investors in encouraging production? Thank you.

Mr. CARLSON. Ms. Schwartz, I will start, if I could, from the biomass perspective.

Yes, there has been a dramatic growth in the RPS standards around the country, to the point now where almost two-thirds of the country's population is covered by a standard requirement, you know, which goes to how effective is the national standard at the rate of growth of the state standards—I mean, several states this year have just boosted. Colorado did, New Mexico did, just recently.

The problem that some of us have in the implementation of the RPS is that there is still not the same level of tax credit for the different technologies. And so, those technologies with the highest tax credit—section 45—are able to bid the lowest bid into the auction, and then they win the bids in the auction. Everything else being equal, the growth of these renewable portfolio standards would be a wonderful thing for renewables of all kinds. But until we have that level playingfield, so to speak, there are some that win bids, and there are those who come close.

Ms. SCHWARTZ. Maybe you can—if I have time, I would like to ask a follow-up question about how do we actually level the playingfield and not create—the most effective, the most efficient, and cleanest—

Mr. GAWELL. I think it is important to note—

Ms. SCHWARTZ [continuing]. And I think the most costly, I guess—go ahead.

Mr. GAWELL. I think this is a really important question, is this inter-relationship between the renewable portfolio standards and the tax credits. It comes up all the time. We get it, as well.

First of all, I think it's important to note that for a developer, or for technology, they do different things. What the California RPS does is give you the opportunity to get a contract for your power. It doesn't provide you the investor, it doesn't find you the resource, it doesn't do other things.

The other thing is there is one thing about America people got to learn. Everybody wants green power, Mr. Chairman, but nobody wants to pay for it. Nobody wants to pay extra. And many of the states, like California and others, they want your bid to come in at, essentially, a commercial range.

And what has been working, I think, for most of the utility-scale renewables, is the combination of the two, where you've got the ability to competitively get new contracts, so you know you can sell your power, and then the investment tax credit, or the production

tax credit, to help buy down the cost of that high capital investment, so that you can bid in at a reasonable rate.

And also, you should know in most of the states we do business in, in the West and out in California, the state actually has to examine your contracts, to make sure you have passed through any tax credit you received adequately. California came this close to saying you had to pass through 100 percent, you know. But they didn't. They still require review of each contract to make sure that you aren't, in a sense, keeping it, but you are at—the consumer is benefiting most from use of it.

So, I think that they actually can be very complementary, and they need to be thought of as complementary. But I will throw in one zinger about RPS's. And, Mr. Larson, this goes back to your climate issues. You know, everybody thinks—I think everybody at this table thinks—we need to do something about climate. But the devil is in the details.

These state RPS's and whether they work right, or don't work right, or help this technology or that technology, I mean, some of these RPS laws that have been passed are voluminous. And there is something in there to make sure everybody gets their little piece of something, and they don't work well when some of them do well.

So—but there is a lot to learn from what the states are doing. There is a lot of activity at the states, both in tax credits and in RPS's. And it's a very complex mix of—they can work together, and where they do work together, you're seeing very dramatic change.

Mr. RESCH. Congresswoman, a very quick response from the solar perspective. The answer is that state renewable portfolio standards do not work for solar energy. There are 23, but the trend that we have seen on the states to actually have distributed generation, or solar carve-outs—Maryland, which just passed one last week, will be signed into law on the 24th, is going to be the most aggressive, that actually says, "A certain percentage of our electricity has to come from solar." And that actually does work for us.

And so, the Berkeley National Laboratory did a study just two weeks ago for the Department of Energy to look at state RPS's. How do we encourage the use of solar? Because it's clearly not working. And they found that a straight RPS does not build new solar. A three-X multiplier does not build new solar. You actually have to have a specific carve-out that you want created.

And so, what I would say in a national RPS is that we should take a look really not toward just a solar carve-out, but more for a distributed generation carve-out, right? So it allows fuel cells and small wind and solar, all to compete in a distributed generation. We get the benefit of a true mix, so that it's not just centralized power plants, but it's also distributed generation power plants, as well, that stabilizes the grid, as well as to increase the use of renewables.

Ms. SCHWARTZ. My suspicion is I don't have time, but I think it is certainly a mix, and I think there will probably be more discussion about how we create as we proceed. So, thank you, Mr. Chairman.

Chairman NEAL. I thank the gentlelady. I believe Mr. Weller has some time left. Mr. Weller?

Mr. WELLER. Thank you, Mr. Chairman, for the opportunity to reclaim my time. Thank you. And the opportunity to be here today.

I would comment to my colleague from Pennsylvania, I also support the idea of a national portfolio standard. I advocated 25x25 approach, and I would like to see this be bipartisan.

Mr. Dinneen, a question I had I would like to follow up, because I was very rushed as we were trying to run over to vote. You know, in Illinois, if you raise corn and soybeans, you're a pretty happy guy. We have prices of corn over 4, soybeans are over \$7. Corn prices have more than almost tripled since the 2005 energy bill was signed into law. So if you raise those products, that's pretty good. And there is going to be a big cost of production this year, but if you're a livestock producer or you're a miller, there is concern.

There is tremendous potential down the road regarding alternative sources of biomass used for biofuel production. And can you share with the Subcommittee what you see as the likely time table with that technology being developed? And then, also, as a secondary question—and others may have talked about this—but what type of incentives would you consider to expedite the new technologies, particularly in the area of cellulose and ethanol?

Mr. DINNEEN. Thank you, Congressman. A couple of really quick points. Indeed, the price of grain has gone up because of the increased demand for ethanol, as a result of the Energy Policy Act. But because the markets respond, they have responded, and 90.5 million acres being planted with corn this year has already had an impact on the marketplace, and those corn prices are coming down. The marketplace will find a new equilibrium that is going to allow for plenty of grain to be grown for energy use and fuel use and fiber use, and it's an amazing thing, the marketplace.

The other thing, just real quick. As you well know, when you're processing grain into ethanol, you are just borrowing the starch. And what is left behind is a very high-value feed product that is then sold to livestock and poultry markets. So that is having a beneficial impact for those livestock industries, as well. And I am sort of the poster child for the fact that we probably have too much starch in our diet, anyway. So, we are making some progress.

Nonetheless, there is no question that we recognize that there are limits to what we are going to be able to produce from grain. And because of that, there is not an ethanol company that I represent that doesn't have a very aggressive cellulose to ethanol resource program underway, in part because they already have some cellulose already coming into their facilities.

And if you are looking for a time table, I think that you will see the commercialization of ethanol from cellulose in the fiber that exists in the corn kernel probably happening first, and it could be as early as this year, when that technology might be commercialized. There are any number of companies that are looking at different technologies, whether it's corn stover or municipal solid waste, or switchgrass.

And there are technologies that range from gasification to enzymatic conversion to acid hydrolysis, all of which have received funding from the Department of Energy recently, to move the projects forward. And while some cynics will tell you that cellulose to ethanol is still a long ways away, I believe that the time table

is far sooner than conventional wisdom would suggest, and perhaps as much as 18 or 24 months, when you add commercial production of cellulosic ethanol.

I cannot tell you which technology, I cannot tell you which feedstock, but as the industry has grown, as new capital has come in, as new intellectual capital has come in, and with all the focus that is being placed on cracking the Code to even produce ethanol from cellulose, I'm certain it's going to happen really soon.

Mr. WELLER. Well, the energy bill provided funding for that research.

Mr. DINNEEN. It did.

Mr. WELLER. And the institutions in my state are participating in that research. But from a tax policy standpoint, any further recommendations that you would recommend to further along the development of the cellulose ethanol—

Mr. DINNEEN. Well, not just because he is on the dais, but I think that the legislation that Congressman Pomeroy has introduced, that would make the tax incentives that exist for ethanol, and extending those and making them permanent, is going to allow the industry to continue to invest in these new technologies, and to continue to invest in new feedstocks.

And I think that would be the most important thing to move this agenda forward.

Mr. WELLER. Thank you.

Chairman NEAL. I thank the gentleman. Mr. Pomeroy is recognized.

Mr. POMEROY. Thank you very much, Mr. Chairman. I want to begin by thanking you for this hearing. As I said earlier, it's been a long time since we had a discussion like this one, and it couldn't come at a better time, trying to sort this all out.

It's basically been a hodge podge of renewable energy incentives in our tax codes to try and evaluate how they're all working, and building a coherent rule, strategy. Thank you to this panel, because I think your testimony has been absolutely excellent.

You see something very transforming in renewable energy from sources as diverse as wind to clean coal, and the ethanol. And closed loop systems, I believe, is just starting to really—we don't know, but it is really transformative.

I would like to just focus on wind for a moment, to discuss the extraordinary growth in capacity. You're talking about a very serious power supply, you mentioned, being reduced now by wind. And a lot more coming up. Can you speak to that, please?

Mr. STEVE. Certainly. Wind is growing fast, but we have to admit we're still less than 1 percent of the power generated in this country. We think we can do a heck of a lot more than that. And again, I think—

Mr. POMEROY. What do you think you can do?

Mr. STEVE. We think we can do something approaching 20 percent of the power in this country, given the tools, given the incentives. And those incentives are—like I keep saying—long-term extension of this credit. Because what we have seen over time—we have been very appreciative of every extension of the production tax credit that this Congress has passed, very appreciative, how-

ever, they have been in short durations. They have been 1 year, one-and-a-half years.

And what we have said to folks is, "Give us at least 5 years, something on the order of 10 years. Two years plus 2 years plus 1 year does not equal 5 years, because of the boom and bust." It is——

Mr. POMEROY. I think the extenders—prior Congresses actually allowed the expiration, and totally disrupted from top to bottom——

Mr. STEVE. Right.

Mr. POMEROY. In Grand Forks, North Dakota, the end of 2003 they had 25——

Mr. STEVE. Exactly.

Mr. POMEROY [continuing]. Because of the expiration——

Mr. STEVE. Yes, and that's exactly what happens with an on-again, off-again policy. And this tortures the books of companies in North Dakota and Shreveport, Louisiana, and elsewhere, is that they have literally got to lay people off. And you don't get those people back if those good-paying jobs——

Mr. POMEROY. You think the technologies that——

Mr. STEVE. Definitely.

Mr. POMEROY. Very well. The question I had on ethanol has largely been asked, Mr. Dinneen, but there is a lot of skepticism about how quickly we can move—we can bring cellulosic ethanol into some dimension of ethanol production in our country. Would you care to speak to that?

Mr. DINNEEN. Sure. There was skepticism in the summer of 2005, when the energy bill was being passed, and people said, "Oh, there is no way in the world that the ethanol industry is going to be able to produce 7.5 billion gallons of ethanol by 2012. That's way too much." And I think the marketplace has gotten the signal that this is real, and this is the place to invest. We are going to hit that 7.5 billion gallon target not in 2012, but probably by July of 2007. I mean, that's how fast the marketplace has responded.

So, I think when you give the proper signal, the investors are anxious to get in. They just want to make sure that there is going to be a market, and it's going to be competitive, and this is the place to invest.

Mr. POMEROY. We are not as far along as Iowa or Minnesota in the ethanol capacity, but we now have plants under construction—I've been to the groundbreaking—that are being built right this minute that will increase our ethanol production tenfold, and we're probably not done yet. I think that's an example of what's coming across the Midwest. It's unbelievable.

Coal. You know, we've got an awful lot of coal resource. You're not asking for tax credits, you're asking for up front grants on technology research?

Ms. FRENCH. What we're asking for is incentives to invest—both technology development and tax incentives to invest in the massive amount of research required if we want to limit and control carbon from coal-fired power plants.

Mr. POMEROY. Sequestration is a principle strategy?

Ms. FRENCH. There are two aspects. One is carbon capture, which in an air-based system means you have to separate out the

carbon from the nitrogen, and the second is carbon storage. Sequestration is the same.

Mr. POMEROY. Jim McDermott mentioned that municipals don't benefit from tax credits. We tried to do a clean renewable energy bond alternative. Is that a prototype that we ought to continue to use to get rural electric coops and municipals—non-taxable systems into the—I see my time is expired, Mr. Chairman, so I—

Chairman NEAL. Proceed, proceed.

Mr. POMEROY. I have no more questions, but I would sure like to—

Chairman NEAL. That's fine.

Mr. STEVE. If I can give an answer to that one, from a wind perspective, yes. That works. And we need to see more money available for those type of efforts by the public power entities, because they do not have—they cannot make access to the Production Tax Credit. This is kind of a—the flip side of the Production Tax Credit.

Chairman NEAL. I thank the gentleman. The gentleman from New York, Mr. Crowley, is recognized to inquire.

Mr. CROWLEY. Thank you, Mr. Chairman. I appreciate very much your extending me the courtesy of—not being a Member of the Subcommittee—being here today. And thank you, also, for opening this hearing today. I think it's one of the most important issues facing our Nation, in terms of reliance upon fossil fuels and especially parts of the world that we rely upon them from, and our dependance upon them.

So, as we move toward weaning us off of—as the President referred to—fossil fuel, I appreciate all the work of the people who are engaged and have been for some time now.

And my question is to fuel cell technology development, that technology, and solar energy as well. I represent parts of Queens and the Bronx in New York, and I have the distinction of representing a studio where the—which has green groups in it. I had the opportunity to tour the facility. It's on old building, but on top of that building they have plants growing, and it's a big source of energy, substantially, with that green roof.

Also, in the Bronx portion of my district there was a new housing Committee that is being developed called "Villa Verde," supported by the Bloomberg Administration, it is providing more housing in the city, and is also environmentally friendly. And I welcome that.

Now, at the Federal level, an issue I have been looking into is the of the tax law for fuel cells installed in non-residential buildings, the same tax treatment as commercial solar installations. And I understand that fuel cell technology has not taken off as it could, due to certain caps, as I have been told, certain caps and limitations within the Tax Code.

I was wondering your thoughts on both the tax parity for fuel cells with solar, and possibly a move toward changing the current tax law to extend the 30 percent fuel cell investment tax credit for an additional 5 years—at least 5 years—with a provision that would strike the \$1,000 per kilowatt cap for the purpose of the tax credit, applicable solely to commercial fuel cell installations, and eliminating the cap, or increasing the cap, to \$3,000 per kilowatt. What are your thoughts on this, and the overall issue of using the Tax Code to promote technology parity?

Mr. ROSE. I will start, if—Mr. Congressman. The fuel cell council's number one priority is the certainty that a long-term extension gives us. And the—that's the consensus view of our industry.

That said, as I mentioned in my testimony, there are some Members of the fuel cell family who are not able to get access to markets nationwide, except in a few states where there are additional, rather aggressive support programs. And these companies say that an increase in the cap as much as \$3,000 would be of substantial benefit to them, and accelerate their deployment.

But the—so at least as far as the official view of the council is, if we had to choose between the lower amount and the longer term and the higher amount and the shorter term, we would prefer the lower amount and the longer term. Ideally, we would prefer the higher amount and the longer term, obviously, and I guess that goes without saying, Mr. Chairman. But—and I hope that answers your question.

I think, you know, some of our Members are—feel \$1,000 is enough. Some of our Members feel that it is not, and that we need additional support. And some of our Members are not there yet in terms of product, and they don't know yet what the right level is.

So, I think the one thing that helps the family of technologies the most, given what we can see today, is the certainty that the longer term credit can give us, and then perhaps we can talk about the appropriate level, and talk in a little more detail about how some of the companies are able to—what limitations it imposes on some of the companies.

Mr. RESCH. I will just provide just a very short response. I actually put this picture up. It's North Bergen, New Jersey. It's not quite your district, but it does show—this is the second largest market for solar in the country, behind California. So New Jersey has prioritized the use in California, because of the grid instability, and the fact they can't build new power plants, it's just too congested. Same thing in Connecticut, actually, a very, very rich program starting to develop there. And then, Long Island, in fact, is the third largest market, and New York, the entire state.

The question you raise is a very good one, which is the proper size and structure of the tax credit. And on the PV side, we're actually, in H.R. 550, looking to modify the tax credit from a cost-based structure to a capacity-based structure, similar to the fuel cell tax credit. And the reason why? That's a more efficient tax credit. It incentivizes lower-cost systems, and encourages competition to drive down costs.

And originally, in the energy bill, that 30 percent tax credit was created, and that was great. It was good recognition. But we have worked with economists, we have worked with experts to say, "Okay, what is a tax structure that, within a timeframe of 8 or 10 years, is going to drive down the cost of solar so we don't need a tax credit?"

We are not looking for permanency, we are looking for a duration that we know is going to deliver results as we scale up manufacturing, create jobs, drive down costs, so that solar becomes cost competitive at the retail level for—in every part of the country.

And so, the structure for fuel cells, in going up to \$3,000 per kilowatt probably makes sense, because that's the structure we are cer-

tainly turning to, in particularly, with basically a \$1,500 per half-kilowatt structure. So we would certainly support that. We think it's a more efficient type of tax policy.

Mr. CROWLEY. Thank you.

Mr. STEVE. Let me just add very briefly from a wind perspective, a smaller portion of our industry is a small wind turbine that you use to power your home or farm, going for the exact same market as is the technology we have just been talking about with the exact same treatment. There is currently no tax treatment for purchases of small wind turbines. We're looking at the same thing.

Mr. CROWLEY. Thank you. Thank you, Mr. Chairman.

Chairman NEAL. I thank the gentleman. The gentleman from California, Mr. Nunes.

Mr. NUNES. Thank you, Mr. Chairman. It is a pleasure to be here.

I just want to make sure that we clarify some of the things that have been said today. The Energy Policy Act of 2005 invested \$9 billion into nearly all of your industries—I think every one of your industries—and it was the largest investment in the history of the United States into renewable energy.

And I just want to see, is there anyone here at the table that thought the Energy Policy Act that passed with very broad, bipartisan support, anyone here, do they oppose the Energy Policy Act of 2005, or do you think it was good for the industry?

Mr. GAWELL. I support it.

Mr. NUNES. Everyone down the line? I know some of you mentioned in your testimony—

Mr. GAWELL. One observation, and it comes back to a couple of comments. You asked us what we could do about things. Well, first of all, at least from the geothermal perspective, you could start implementing—or the administration could start implementing—all of the provisions they haven't done rules for. I think we all support it, and we would like to see the Energy Policy Act really implemented now.

Mr. NUNES. Sure.

Mr. ROSE. And may I also comment? I think it's an important point that you really asked two different questions. One, I think we all support the Energy Policy Act, but that doesn't necessarily mean that it has been fully effective for my industry, at least.

One of the issues that came up was this issue of Federal purchases of fuel cell units and other advanced energy technologies, and that has not yet been funded by the government, nor have appropriations been requested by the President. We are working with the Department of Energy now, we're in the third year of those discussions.

And that—you know, in my industry, if you want to help us buy some units—and I think that is a critical piece of—one of the reasons why we're here, is we're here helping the private sector buy units, and the Federal government can also step up. And so I'm sorry for that elaborate answer, but—

Mr. NUNES. I think all of us here, you know, including myself, have ways, you know, that we want to improve, you know, renewable energy in this country. I have had a bill, and I think everyone

here in the Ways and Means Committee has a bill that they have worked on in the past.

But I just want to make sure that everyone knows that in 2005, the Energy Policy Act was—it did open the door. We know it hasn't been fully implemented, but it's working. And in large part, I think it's been good for our economy.

I want to ask Mr. Dinneen a question. I have an interest in cellulosic ethanol, and I know that you are very familiar with that subject. But there is this ongoing issue, is it really viable. And I know that I read, at least in some news reports, that the government just gave out some grants for cellulosic ethanol startups.

Can you tell the Committee at all, give a date or time that we can actually expect to go out and visit or see cellulosic ethanol being produced? Do you have a timeframe, or a time line that we can expect to see that?

Mr. DINNEEN. Well, I tried to talk a little bit about that earlier. I do think that you're going to see commercial sale of ethanol production soon, likely from fiber, first. There is a plant—

Mr. NUNES. Like straw?

Mr. DINNEEN. The fiber I'm talking about is from the corn kernel itself, the corn fiber.

Mr. NUNES. That's what you were talking—

Mr. DINNEEN. Because it's already coming into the facility. And even breaking that down—that's cellulose and breaking that down has been a challenge. But the technology is very close to being commercialized.

Because of the Energy Policy Act you have been talking about, which provided some grant funds, DOE about 3 weeks ago did announce 6 different grants, 382 million, to 6 different companies in 6 different parts of the country, using 6 different feed stocks. And I can't tell you which one is going to succeed first.

I do know this summer there will be a groundbreaking at a cellulosic ethanol in Emmitsburg. A comment about needing to make sure that the Energy Policy Act is, indeed, fully implemented. There are a couple of those cellulosic facilities that are still looking for the loan guaranteed funds to be appropriated, in order to move forward with their plans.

But there are companies that are looking to break ground as soon as loan guarantees are secured on a wheat straw ethanol plant in Idaho, on a waste-to-ethanol plant in Los Angeles, on a woody biomass cellulose plant in Georgia, on a waste plant in New York State. So we are right there. We are on the cusp, and I do believe within—I hate to try to give a timeframe, because inevitably you're wrong, but you know, within two years, three years, there is going to be commercial production of cellulosic ethanol in a significant way.

Mr. NUNES. Well, I think that is very exciting, and I am glad you are here before the Committee, because I think we really need to—the sooner that can happen, I think the better, and people will start to believe in cellulosic ethanol.

So, thank you all for being here, for your testimony, and thank you, Mr. Chairman.

Chairman NEAL. Thank you. Mr. Steve, you highlighted my argument that green was the new red, white, and blue, by testifying

that the torch of the Statue of Liberty was lit by wind power. Thank you for reinforcing that position.

Can you tell the Committee what are the most expensive aspects of producing energy which causes your industry to need incentives?

Mr. STEVE. Yes, certainly. The biggest one, I would have to say, is access to electric power transmission lines. There are areas of the country where you can produce vast amounts of wind power. And what we're looking for particularly in the Dakotas, areas of Texas as well—really, throughout the whole kind of heartland of the country—you don't have a big enough extension cord in order to get that power out of there to where it's needed in, say, Chicago, in the population centers.

So, we can produce the power, but the country really needs to invest in a 21st century transmission system, not just for wind, but for all resources, for all renewal resources, for coal, for, you know, any kind of electric generation source possible. That's the biggest cost right now.

Again, I keep hammering on this point. Long-term credit at full value is going to help us bring this—

Chairman NEAL. Thank you. I would like to recognize Mr. Weller, if he would like to do a follow-up question.

Mr. WELLER. Thank you, Mr. Chairman. And, you know, Mr. Carlson, you use biomass generation of electricity, and we have talked about cellulosic ethanol. Let me just ask what might be an obvious question. Is there plenty of biomass to go around?

We are going to be using biomass for production of ethanol, as well as electric. Is there going to be a point where we're going to be—

Mr. CARLSON. Well, there have been several studies on that, most recently by the 25x'25, which I'm on the steering Committee, which I have referenced a couple of times. And they show that there are staggering amounts of biomass, and it could be very—whether they be in dedicated energy crops, or whether we grow things on conservation reserve program lands, you know, which is the more controversial.

And then, of course, the one that our industry relies on, to a large extent, and could make the largest contribution, and that is the health of nation's public forests, restoring that health by removing some of the excess materials that are out there that fuel these catastrophic wildfires that you all read about in the newspapers every summer, and they get larger every year. And so, there is a staggering amount of cellulose material that could be produced in the U.S.

I think the goal of, you know, 25 percent of the nation's total energy, primarily driven, again, by biomass resource is, indeed, obtainable.

The nice part about the work that Mr. Dinneen does in renewable fuels, versus the work that I do in biomass power, is that there is compatibility between those two, where those facilities that produce renewable fuels also use a large amount of energy internally, and that is where they can provide—combined heat and power, both electricity and steam, that they need for those processes.

And they may—the breaking down of the cellulose also frees up the component which basically makes the corn stalk stand up, and basically then—if that's a more difficult task, for them to break that down, then that could become a fuel for our industry. So all of these work in tandem, and I think all of this resource will be used completely.

And I think that there is a staggering potential for this in the U.S. I mean, there are temporary dislocations, as have been mentioned, like corn ethanol growing so rapidly that the price has gone through the roof. But on a more long-term basis, I mean, I think there is almost an unlimited capability. The U.S. is—there is a tremendous amount of biomass that goes to waste—

Mr. WELLER. There is a—in my district —

Mr. CARLSON. Yes. That's right. I mean—

Mr. WELLER [continuing]. That produces watermelons. I'm told that they throw away 800 million pounds of watermelons a year. There is never a short on watermelons.

Mr. CARLSON. Where I am from in California, they actually grow watermelons just for the seeds. Now, there is a waste.

Mr. WELLER. But the 25x'25 concept, can we achieve a 25 percent portfolio of renewable sources, you know, alternative sources, for our nationwide energy consumption prior to 2025? Do we need the next 18 years to achieve that goal, or can it be done more quickly?

Mr. CARLSON. Well, if you look at the recommendations of 25x'25, it started with the incentives that are there, and they created some new programs to enhance those. And of course—the answer is of course. We could achieve it before 2025 if we really wanted to put either the market drivers in place—some of this has been talked about today, in terms of other taxes. And you can do this all with incentives, obviously.

And—but it's so difficult. They are—it's very expensive to increase the incentives, obviously. But you don't value the things that you have saved. You don't value the national security, the benefits. If you would, you would find that these incentives are very well paid for, justified, to give us by 2020 or 2018, because, you know, the—it's—I mean, there is still a lot of entrepreneurs out there that are willing to put their capital into a market that they know is going to be there.

Mr. WELLER. Thank you. Thank you, Chairman.

Chairman NEAL. I want to thank the panelists today. I thought your testimony was exceptional. And it is going to be very helpful, as we move forward, in crafting our legislation.

I also think it's important to acknowledge the number of Members who attended today, and Members who are not on the Subcommittee, in fact, showed up. I think that highlights the intense level of interest in energy issues, as they relate to the national security.

So, please note that there may be some written follow-up questions from Members. And without objection, the record will remain open for these questions and answers. If there are no further comments, I wish to adjourn this meeting and say thanks to all.

[Whereupon, at 4:50 p.m., the Subcommittee was adjourned.]

[Submissions for the Record follow:]

Statement of American Institute of Architects

The American Institute of Architects, the voice of the architectural profession and the resource to its 80,000 members in service to society, strongly supports governmental policies, programs, and incentives that encourage energy conservation—especially as they relate to the built environment. We applaud the efforts of Chairman Neal and the Members of the subcommittee for holding this important hearing on how tax incentives can increase the development of alternative energy technologies and improve energy efficiency.

In order to significantly improve energy efficiency in the United States, we must make a serious commitment to designing and constructing more energy efficient buildings. The building sector is one of the largest consumers of energy in our nation and is responsible for a massive share of the electricity used. One way to spur the development of energy efficient buildings, and thus reducing the amount of energy the building sector consumes, is through tax incentives. Specifically, extending and enlarging the Energy Efficient Commercial Buildings Tax Deduction (Public Law 109–58, § 1331) will provide the necessary incentives to spur the design and construction of more energy efficient buildings in the United States.

According to the Department of Energy's Energy Information Administration, the building sector accounts for 39 percent of total U.S. energy consumption, more than both the transportation and industry sectors.¹ The same report found that buildings are responsible for 71 percent of U.S. electricity consumption. Therefore, if we in the United States want to be serious about energy efficiency, buildings *must* become a significant part of the discussion.

Over the next 30 years, the character of the built environment will change dramatically. Currently, U.S. building stock sits at 300 billion square feet. Experts predict that between now and 2035, 52 billion square feet will be demolished, 150 billion square feet will be remodeled, and another 150 billion square feet will be newly constructed.² Because buildings are such a major consumer of energy, the AIA believes that if Congress and our nation want to significantly improve energy efficiency, addressing energy consumption in the next generation of buildings is a vital endeavor. Providing incentives for designing and constructing energy efficient buildings and for installing energy efficient systems in them is an effective way for the Federal Government to promote a sustainable future.

Federal tax incentives designed to spur the construction of energy efficient buildings are currently in place, but in order for these incentives to be utilized to their potential, some changes are needed. Specifically, within the Energy Policy Act of 2005 (Public Law 109–58), Congress approved a provision that created a tax deduction for the design and construction of commercial buildings that meet a high standard of energy efficiency.

Known as the Energy Efficient Commercial Buildings Tax Deduction, this incentive allows building owners to claim a tax deduction of up to \$1.80 per square foot of building area for the installation of systems that reduce the total energy and power costs by 50 percent or more when compared to a specific industry standard for energy efficiency (ASHRAE 90.1). The building systems eligible to secure the tax deduction include interior lighting systems; heating, cooling, ventilation, and hot water systems; and building envelope systems.

Some energy efficient systems are more expensive to design, build, and install than their traditional counterparts. Thus the initial increased capital costs often dissuade owners from installing these systems. The Energy Efficient Commercial Buildings Tax Deduction addresses this situation and provides building owners with the financial incentive to build in an energy efficient manner.

The AIA strongly supported the enactment of this tax deduction; however in order to ensure that it can continue to be used to encourage the construction of energy efficient buildings, the deduction must be extended and enlarged. The current deduction can only be claimed for buildings placed into service by December 31, 2008. As it often takes years to move from the building's initial design stage to final completion, many buildings on drawing boards today will not be placed into service until long after the deduction has expired and therefore are unable to reap the intended tax benefit for installing energy efficient systems. Therefore, the AIA encourages Congress to extend the Energy Efficient Commercial Buildings Tax Deduction for a sufficiently long and predictable period to allow designers of future structures to factor it into their financial calculus.

Legislation has been introduced in both the House and the Senate that will extend the Energy Efficient Commercial Buildings Tax Deduction. H.R. 539, The

¹ <http://buildingsdatabook.eere.energy.gov/docs/1.1.3.pdf>

² <http://www.architecture2030.com>

Buildings for the 21st Century Act, will extend the tax deduction until 2013. This bill, introduced by Rep. Allyson Schwartz, has attracted 136 bi-partisan cosponsors and if adopted, would ensure that any buildings that meet the efficiency requirements under the deduction and are placed into service by 2013 will be able to claim the deduction. In an effort to further increase the deduction's effectiveness, H.R. 539 increases the deduction from the current \$1.80 per square foot to 2.25 per square foot. The AIA strongly supports this bill because exceeding ASHRAE 90.1 by 50% is a significant leap in energy efficiency and, in most cases, will require capital expenditures in excess of \$1.80 per square foot to reach it.

We applaud the Subcommittee for addressing this issue and urge it to extend and deepen the Energy Efficient Commercial Buildings Tax Deduction.

Statement of Andrew J. Skok, Fuel Cell Power Association

The Fuel Cell Power Association (FCPA) appreciates the opportunity to submit this statement in support of extending and expanding the current tax credits available for fuel cells. The FCPA consists of companies involved in stationary applications of fuel cells for electric power plants on both a commercial and research and development level.

Fuel cells are ultra-clean systems that produce power at very high efficiencies at scales ranging from a few kilowatts per installation to multi-megawatt power plants. They are applicable to both distributed generation and central station power and can also operate in a cogeneration mode to utilize waste heat from the system. Fuel cells can also operate on a variety of fuels including natural gas, gasified coal, digester gases from waste treatment facilities, other biofuels, and hydrogen. Their versatility, efficient operation, and environmental characteristics have made them a very desirable alternative to current fossil fuel fired power systems and have resulted in considerable support for their accelerated development through research and development programs of the Department of Energy.

Considerable progress has been made in fuel cell development over the years and several products are at a commercial threshold. As with many new technologies such commercialization has been inhibited because of high initial cost of products and the resulting low volume of sales. Large investments in production capacity are unlikely without incentives to drive down the cost of the initial commercially offered systems so that significant volumes of fuel cell sales may reduce unit costs for the systems.

This Committee has recognized both the environmental and efficiency benefits of fuel cells as well as the need for incentives to accelerate their commercial introduction through enactment of the Section 48 fuel cell investment tax credit included in the 2005 Energy Bill. The FCPA appreciates the Committee's action in this regard. In combination with State-based incentives these incentives have helped FCPA members complete agreements for the installation of fuel cells in a handful of states that offer such incentives, particularly California. However, such installations are only viable in a small number of states and only when very high cost power is the competition. In order to compete nationally in the short term, fuel cells need to receive additional incentives. We believe, based on incentive levels in California, that an investment tax credit of \$3,000 per kilowatt is necessary. Such a credit will encourage a comprehensive base of fuel cell installations in much broader applications than are currently financially viable. It will provide a significant increase in the volume of fuel cell sales, which in turn will encourage larger manufacturing capacity. These actions will result in significant reductions in fuel cell manufacturing costs making the technology viable in more markets.

In addition to an increase of the ITC to 3,000 per kilowatt, the FCPA joins the U.S. Fuel Cell Council in requesting that the provision be extended for eight more years. Such an extension will allow for a stable industry to be formed, as well as encourage the introduction of new, even higher efficiency, technologies now under development by the industry. It will also encourage increases in production capacity and construction of facilities related to new fuel cell technologies and foster the viability of markets for the resultant products.

Finally, the FCPA understands that currently if an entity opts to take advantage of the ITC it may not utilize the Production Tax Credit (PTC) available for electricity produced using biofuels. Removal of the prohibition on using both credits would make fuel cell use in renewable applications much more financially viable, particularly where competing electricity prices are low.

The fuel cell industry is in a position to provide very-high efficiency power in both distributed and central station power applications with a minimum of environmental emissions. The technology has received significant support from the Federal government over a considerable period of time and is now at the threshold of commercial viability. Continuing and improving the tax incentives originally provided by this Committee is in the interest of this nation as it strives to reduce the environmental impact of electricity generating technologies and reduce overall energy use and dependence on foreign sources of energy. Therefore, the FCPA recommends that:

- The ITC be increased to \$3,000 per kilowatt,
- The ITC be extended for 8 years, and
- Fuel cell users be permitted to claim both the ITC and the renewable energy PTC for electricity from biomass sources.

Statement of Association for Commuter Transportation

The Association for Commuter Transportation (ACT) congratulates the House Ways & Means Committee for holding a series of committee hearings on energy and tax policy. Additionally, ACT would like to urge the Ways & Means Committee to hold additional hearings on this subject matter, specifically regarding tax policy & the demand side of energy consumption.

As the Ways & Means committee considers policies to establish energy independence, it is important to consider not only the supply side of the equation, but also the demand side. Much of Congress' focus to date has centered on the need for cleaner, more efficient energy supplies, i.e. hybrid automobiles, alternative fuels, ethanol, etc. While these are all certainly worthy causes, their benefits will diminish if the demand for energy continues to increase at the current rate. This is particularly relevant in the transportation sector. Increase vehicle miles traveled (VMT) has negated any increase in fuel efficiency rates over the past decade. Additionally, increased VMT leads to increased congestion which leads to an increase in fuel consumption. An energy bill will not be complete without taking aim at reducing VMT.

ACT has developed a white paper (attached) which identifies 4 key strategies for reducing VMT, promote innovative solutions to congestion relief, engage employers in an effort to reduce congestion, improve the congestion mitigation and air quality program, and expand options for commuters. Within these four strategies are a number of recommendations and implied legislative remedies. While some of these recommendations lie outside of the jurisdiction of the ways and means committee, ACT has a number of recommendations it feels would improve an energy bill.

- Create parity between the transit/vanpool and parking portions of IRC 132(f) (HR 1475);
- Approve the Bike Commuter Act (HR 1498);
- Resurrect the Investment Tax Credit established by the 1978 Energy Policy Act;
- Provide tax credit for the purchase of equipment used for teleworking;
- Tax Credit for Employers who subsidize their employees alternative commutes; among others.

ACT developed this white paper and recommendations with budget realities in mind. Many of the recommendations come at no cost to the Federal government. These recommendations also provide cost effective results.

For example, if the Investment Tax Credit for vanpools originally in the 1978 Energy Policy act were resurrected, it is estimated that vanpooling nationwide could triple over the course of several years. If the growth, as expected, were to occur, it would mean an additional 16,000 vanpools operating nationwide, leading to the conservation of hundreds of millions of gallons of gas each year. The 10-year cost to the Federal treasury would be roughly 50,000,000. Consider this when looking at other tax credits currently being discussed. The chart below compares the daily consumption of fuel for commutes to and from the work place. A typical vanpool is 3 times more fuel efficient than 10 new hybrid autos, and 6x more fuel efficient than 10 new autos. Plus, every vanpool placed into service reduces the number of peak hour autos in commute traffic by a factor of 10.

Fuel Efficiency of Single Occupant Autos vs. Hybrid Autos vs. Vanpools			
	10 Peak Hr Autos @ 1.1 Avg. Occupants	10 Peak Hr Hybrid Autos @ 1.1 Avg. Occupants	1 Peak Hr Vanpool @ 11 Avg. Occupants
Mileage per Gallon	22 mpg	43 mpg	13 mpg
Daily Commute	50 miles	50 miles	50 miles
Fuel Consumed/Vehicle	2.27 gallons/vehicle	1.16 gallons/vehicle	3.85 gallons/vehicle
Total Fuel Consumed	22.7 gallons (10 autos)	11.6 gallons (10 hybrid autos)	3.85 gallons (1 vanpool)

ACT is hopeful that it will be afforded an opportunity to share more of its views before the Ways & Means committee at a hearing dedicated to demand side energy tax policies and proposals. If you have any questions, please contact Jason Pavluchuk, ACT's government relations liaison.

Jon Martz
President

Nicholas Ramfos
Vice President

Lynn Osborn
Secretary

Brian Shaw
Treasurer

Elizabeth Stutts
Immediate Past President

Mark Wright
Executive Director

Statement of Avista Corporation

We are writing to urge you to (1) extend the 30 percent Investment Tax Credit (ITC) for solar energy property for a minimum of eight years; and (2) remove the current 'exclusion' in Internal Revenue Code section 48 that prevents electric utilities from claiming the energy ITC.

The 30 percent commercial solar property ITC, which is scheduled to expire on December 31, 2008, provides an incentive for development of commercial solar projects that has spurred new growth in U.S. solar power generation. In order to maintain this potential, it is critical that Congress provide a long-term extension of the 30 percent commercial solar ITC.

In addition, an obvious way to support large-scale development of solar power in this country is allow the sector that may have the most to offer toward this goal—electric utilities—to claim the same tax incentive that other businesses can. Granting electric utilities the ability to take advantage of the solar investment tax credit by removing the section 48 electric utility exclusion will encourage broader and more efficient development of solar power, resulting in more use of solar power and lower cost to the consumer.

Many in the electric utility industry are increasingly hopeful and optimistic about the long term potential of solar power as an important contributor to our nation's energy generation portfolio. A long-term extension of the existing commercial solar ITC for eight years or more and removal of the section 48 electric utility exclusion will provide the market stability necessary in the solar sector to encourage long-term large-scale solar investments, including by utilities. These changes would help underpin what we hope will be dramatic growth in solar power generation in this country.

We appreciate your support for the long-term extension of the commercial solar ITC and the removal of the section 48 electric utility exclusion.

Statement of Blue Mountain Energy

Thank you for the opportunity to submit testimony regarding energy efficiency tax credits and inclusion in upcoming legislation. My name is Paula Young representing Blue Mountain Energy (BME). BME is a consulting company who provides professional scientific and technical expertise for research and development projects. We are working in conjunction with our local distribution company, Southwest Gas Corporation, to develop and demonstrate gas-fired heat pumps in the Southwest United States.

We are pleased that H.R. 1385 and S.822, the EXTEND Act includes investment tax credits for both residential and commercial gas fired heat pump purchases. We have worked extensively with the Natural Resources Defense Council, the American Council for an Energy Efficient Economy and the Alliance to Save Energy to ensure that these credits are for only very high efficiency equipment and that they move us towards a cleaner and more efficient energy future.

Tax credits for gas fired heat pump technology is included in the EXTEND act in Sections 102 (for Residential equipment) and in 204 (for Commercial equipment). The credit would be only for those systems with a coefficient of performance of at least 1.1. Two types of small gas-fired equipment are expected to be eligible for the credit.

1) Absorption Heat Pumps use a refrigerant, absorbent and heat to create a cooling effect. Simply put, the cooling effect is accomplished with the removal of heat through evaporation of a fluid (refrigerant) at low pressure and the rejection of heat through the condensation of a fluid (refrigerant) at a higher pressure. In the chiller unit, heat provided by a gas burner boils the ammonia out of the water and condenses it in an outdoor coil. The ammonia is then evaporated at low pressure, cooling a circulating water system. The chilled water circulates through the area to be cooled via a piping system eliminating the need for ductwork and making the system well suited to a variety of applications. The ammonia is then reabsorbed into the water (the absorption process) and the cycle repeats. In heat pumping mode, the cycle is reversed.

2) Natural Gas Engine Driven Heat Pumps utilize proven, built-for-purpose natural gas engines, robust compressors, and standard air conditioning components. In heating mode, the technology is able to take advantage of waste heat from the engine for extremely high efficiencies. The technology runs very much like electric equipment; however, the engine running the compressors operates on natural gas directly instead of electricity.

Gas-Fired cooling (air conditioning) is currently used in approximately 3% of buildings nationwide with all of that being in the large tonnage arena (medium size to large size commercial buildings). There are only a couple manufacturers building packaged gas-equipment for the small commercial and residential market with sales being in the less-than 500 per year range. The greatest advantage of increased national use of natural gas-fired cooling is the more efficient use of our natural gas and the reduction in peak electricity loads in the hot summer months. Gas heat pumping is entirely new technology that is significantly more energy efficient than current gas heating technologies.

Societal Benefits of the Technology that warrant the credit

- *Energy Efficiency:* These technologies are at least 50% more efficient in heating mode than existing natural gas heating. In cooling mode, there is little to compare to except incumbent technology, which runs on electricity; however, overall use of natural gas is reduced when it is used directly at the unit. Additionally, in cooling mode, the COPs are better than those currently being achieved by large sized gas cooling technology.
- *Conservation of our nation's natural resources:* Electric generation power plants are generally less than 50% efficient, with many plants having significantly lower efficiencies. The direct use of natural gas will can achieve a two to three-fold increase in efficiency. Additionally, combined cycle power plants use approximately one third of a gallon of water to produce one kilowatt-hour of electricity, whereas these technologies require either no water (in the case of the engine technology) or very little (in the case of absorption).
- *Reduction of Peak Electricity Demand:* Summer air conditioning has lead to higher peak demand in the summer increasing electric rates substantially. In addition, during the summer, the electric peaking plants tend to generate both the most inefficient and the most expensive power. Increasing direct use of natural gas in the summertime will significantly reduce this peak demand for electricity and even out the demand for natural gas.

- *Cost savings for consumers:* Utilizing natural gas directly at the gas heat pump will provide meaningful year round energy cost savings. Thus, the lifecycle costs are lower when installing gas fired equipment. Natural gas heat pumps use natural gas during the “off peak” summer months, which in turn, reduces the customers overall electric demand charges by significantly reducing their electrical requirements during the times when electrical prices are the highest. A natural gas heat pump is also a more efficient heating system; consequently, the amount of natural gas used in the winter months is less than a conventional gas furnace, providing even more energy savings and conservation benefits. Additionally, when manufacturing volumes increase, first cost could be on par with the incumbent technologies.
- *Low Environmental Impact:* The direct use of natural gas provides a two to three-fold increase in efficiency. This increase in efficiency saves both natural gas and water over the long run. The technologies also do not use harmful refrigerants.
- *National Security:* Natural gas is primarily a domestic resource and our overall energy security is enhanced through the reliance of this abundant domestic energy source. The natural gas industry’s underground pipeline delivery system is very efficient and reliable and not as vulnerable to attack or natural disasters as electricity delivery systems.
- *Fuel Diversity:* Consumers currently do not have fuel choice in their air conditioning needs. These products would be the first to offer that choice
- *Consumer benefits:* Unlike most electric technology, the systems can have multiple zones for comfort control, they are very quiet and safe to operate with minimal moving parts

We urge inclusion of the equipment provisions under sections 102 and 204 of the EXTEND act by included in any energy tax legislation moving through the congressional process this year. Thank you for the opportunity to comment.

Statement of Commuter Check Services Corporation, Watertown, Massachusetts

As the House Ways and Means Committee analyzes ways in which the tax code can be used to promote alternative energy, Commuter Check Services would like to take the opportunity to urge the Committee to also be mindful of those actions and initiatives that Congress can take which will reduce demand energy consumption. One of those initiatives is to promote usage of the transit portion of the transportation fringe benefit, specifically, report HR 1475, introduced by Congressman McGovern (D-MA) which would create parity between the parking and transit portions of the commute benefit.

Issue. Transit Benefits are authorized by Section 132(f) of the Internal Revenue Code, which allows for pre-tax salary deductions for transit and parking or employer subsidized transit or parking. The transit provisions include vanpool services. The current tax-free limit for transit is 110 per month; the limit for parking is 215. The inequity discourages public transit use, encourages automobile commuting and consumption of gasoline, and the associated impacts on air quality, climate change and related concerns.

History. The transit benefit was first “codified” in 1984 and limited to 15 per month. Its popularity and consistent support by Congress has resulted in the benefit being increased and expanded as follows.

- 1984: Legislation codifies transit benefits, \$15 per month maximum (“cap”), limited to employer subsidy
- 1991: IRS raises transit benefit cap to \$21
- 1992: Legislation raises cap to \$60 per month
- 1995: Inflation adjustment raises cap to \$65
- 1998: Legislation adds the employee-paid pre-tax payroll deduction option
- 2002: Legislation raises the monthly maximum benefit cap to \$100
- 2005: Inflation adjustment raises cap to \$105
- 2007: Inflation adjustment raises cap to \$110

Participation. Employers of all sizes and types, in the public, private and non-profit sectors, use the transit benefit, from the smallest employers to the largest private companies, as well as local and State governments and the U.S. Government. It is estimated that over 50,000 employers use transit benefit programs, which are operated by local transit agencies, regional planning agencies, private businesses

and chambers of commerce. It is estimated that over 1.5 million commuters now use the transit benefit, in every State of the country.

Need for Increase. Use of the existing program has been strong, but the lack of parity for the transit and parking provisions limit the effectiveness of the transit benefit. The \$215 limit for tax-free parking allows parking to be fully paid on a tax-free basis for all but a very small share of auto commuters. Numerous U.S. DOT and EPA studies have identified free parking as a major if not the single most important urban transportation problem. In contrast, the 110 cap for transit means that many transit riders in all of the major U.S. transit markets are unable to get their transit pass with tax free funds. Transit fares exceed 110 per month for transit operators in Boston, Chicago, New Jersey, New York, Philadelphia, San Francisco, Virginia, Maryland and elsewhere. The vast majority of all transit rides taken are in these cities.

Impacts. Even with the lower tax-free limits for tax-free support of transit, numerous studies, including one performed by the National Academy of Science, have documented the effectiveness of the transit benefit in building transit use. The transit benefit is especially effective in building transit use because it focuses on the worksite, the destination for commuting trips. It is a cost-effective way to target tax support for to reduce peak period congestion and the associated environmental impacts. A summary of the many studies performed on the effectiveness of the transit benefit appears on the following page.

Cost Offset. To offset the cost of creating parity, the tax-free limit of \$215 per month for parking would be reduced to \$200, and the cost-of-living adjustments included in Sec. 132(f) would be frozen in order to pay for the increase of the transit portion.

Simple Elasticities

Considerable data on the impacts of transit benefit programs is available, but the obvious and well-documented relationship between fare levels and ridership is the simplest confirmation. Decades of experience show that for every 10% increase in fares ridership falls by 3%. The reverse is also generally true; fare reductions build ridership by approximately 30% of the price reduction. Thus, if an employer benefit program reduces employee fares by 40%, the ridership growth would be expected to be 12%. As shown below, actual impacts appear to be greater, i.e., that employer-based tax incentives are more effective in building ridership than fare reductions are. This is likely because transit benefits are an incentive that focuses on the largest opportunity to build ridership—auto users.

National U.S. Study (National Academy of Sciences, TCRP, 2005)

“Employer programs contribute 5 to 25% of total transit rides and 5 to 40% of revenues.”

“Transit ridership generally increases 10% or more at participating worksites.”

“More than half of the surveys reported an increase in transit riders between 10 and 40%, and nearly one quarter reported increases of more than 60%.”

“Two surveys (San Jose and Atlanta) suggest that transit ridership more than doubled after a transit benefits program was implemented.”

Bay Area Study

General: Transit subsidies generated an increase in transit commute trips of 25% in San Francisco and 48% in outlying areas.

Apple Computer: Number of participants in transit program tripled when transit voucher program replaced pass program.

Lawrence Livermore National Laboratory: “Use of transit rose 50% when we began offering Commuter Checks.”

Hewlett Packard: Transit use rose 100% when the employer pass program was changed to a transit voucher program.

Bay Area Rapid Transit District (BART): Employer programs serve over 60% of peak period employed riders (2006 study).

Philadelphia Region

35% of participating employees indicated they use transit more often than before they started using TransitCheks.

8.5% were new users to transit.

13.7% increased the total number of trips per week ($\frac{2}{3}$ from new users, $\frac{1}{3}$ from added frequency).

Average number of new trips per week = 6.6.

New York

14% of TransitChek users said they did not use transit before receiving TransitChek.

10% of TransitChek users reported increased transit use *for commuting* after receiving TransitChek.

24% of TransitChek users reported increased transit use *on weekends* after receiving TransitChek.

15% of TransitChek users reported increased transit use on weekday evenings after receiving TransitChek

Accor Services USA**Statement of Environmental Power Corporation**

Good Morning, Mr. Chairman. I am Joe Cresci, the Chairman of the Board of Environmental Power Corporation. EPC was founded in 1982 and is headquartered in Portsmouth, New Hampshire. Since its founding, Environmental Power has developed only generating facilities powered by non-conventional fuels and renewable energy sources, including hydro-electric and waste coal-fired generation.

The focus of my comments this morning is our subsidiary, Microgy, Inc., headquartered in Golden, Colorado. Microgy develops biogas systems, utilizing anaerobic digesters, which are very efficient at extracting methane-rich biogas from a combination of livestock manure and other organic and food industry wastes. To date, we have completed or announced projects in Wisconsin, California, Texas, and Nebraska. With appropriate public policy, we see large market opportunities in many other areas of the country, including large and small agricultural areas that are home to dairy and feed cattle farms as well as swine production areas.

We refer to our biogas as RNG—Renewable Natural Gas. Our RNG is used to produce “green” pipeline-grade methane, thermal energy or electric power. Microgy, along with our Danish licensor, has significantly improved conventional anaerobic digestion technology, enabling us to generate RNG at volumes and costs that are commercially attractive.

Although SEC regulations and competitive considerations do not permit me to discuss cost and pricing matters in detail, I can say that we believe our RNG will be competitively priced compared to projected prices for LNG imports. At the same time, our technology and manure handling processes also significantly reduce greenhouse emissions, improve water quality and dramatically reduce odors around animal operations.

There are three areas where support from the government could allow this expanding technology to compete with the highly capitalized and government-subsidized existing energy infrastructures.

1) *First, a credit for the production of biogas from certain renewable feedstocks:* this production tax credit should be on a parity with biodiesel from waste oil, which is the most comparable product for a renewable fuel already on the books. The credit also needs to be transferable under rules and regulations created by the Secretary of the Treasury. A tax credit which is not monetizable is significantly less valuable to a small, emerging industry which may not yet be turning a profit.

2) *Second, a counter-cyclical safety net program for biogas producers:* this would be a payment first used to pay down loans and other obligations from the building of a facility if the average daily price of natural gas fell below a predetermined price for a prescribed period.

3) *Third, transportation incentives for smaller operators:* these would help incentivize multi-farm collection and transportation of qualified energy feedstocks from smaller livestock operations to a qualified facility or for the purchase or construction of equipment or facilities for collection and transportation.

Why is this technology development so important? Anaerobic digesters (AD) are devices that capture, control and enhance the degradation of organic material. Two principal benefits occur: production of *energy* and *environmental benefits—including large scale greenhouse gas capture and manure management*. The biogas produced by anaerobic digestion is composed of about 60% methane, the principal ingredient of natural gas, with most of the rest being carbon dioxide. Methane, which is 21 times more damaging as a greenhouse gas than CO₂, would ultimately escape into the atmosphere if not captured in the AD process. Biogas can be used “as is” as a power source, or cleaned up to be used as a renewable substitute for natural gas, propane or other fossil fuels. If to be used for interconnection with the natural gas

pipeline, the biogas must be scrubbed until it is in excess of 95% methane. It is worth noting that with current scrubbing technologies, the additional capital and operating cost is only justified in the case of larger-scale systems.

In the U.S., until recently, use of AD has been limited to old-generation, small-scale technology. Currently, however, advances in technology have made AD more cost competitive with other types of energy. While viability is well established at operating facilities, large scale deployment of this type of energy production requires support comparable to that provided to competing sources of energy in order to expand and develop the potential market into a significant renewable energy source that can truly impact the country's needs for alternatives to fossil fuel.

Digesters are normally designed to process the feedstock available to them and can be scaled up and down in size. However, in order to access the commercial mainstream—that is, to be economically viable and make a significant impact on our energy supply—larger-scale systems are necessary to achieve economies of scale in both production and market access, including access to the existing infrastructure for marketing, transportation and distribution of conventional fuels.

Our on-the-ground experience and market research has shown us that the small-scale, single farm systems face a host of difficulties. They have relatively high expense due to a lack of economies of scale, and often, poor operational results. The systems are typically operated by the farmer, who is not and does not want to be an expert on AD and manure management. Smaller operations also have interconnection issues. The small energy producer is not worth a utility's time and effort and have even more limited private sector financing opportunities. Their economic viability relies heavily on existing USDA and state grant and subsidy programs.

Larger-scale systems allow for professional management, negotiation of energy agreements with utilities and other energy end users, efficiencies and economies of scale, and especially, the volumes of output required for refinement into pipeline quality renewable natural gas for delivery via our nation's existing transport and distribution infrastructure, the interstate pipeline system. Such projects have numerous commercial financing options. The farmer, rather than diverting his efforts to his own system, can receive a slice of a larger pie, without a financial or management investment on his part. In Microgy's business model, we seek to become the partner of the farmer, with our specialty being the day to day operation of the anaerobic digester.

AD utilizing animal and other byproduct materials can generate significant quantities of energy in the United States. We estimate that AD systems on *larger-scale* dairy, swine and beef farms, if fully operational and with a complete supply of all feedstock materials, could produce well over 340 billion cubic feet of natural gas equivalents per year. Note that 1000 cubic feet of natural gas equals approximately 1 million btus. The potential production of 340bcf has the energy equivalent of approximately 2.5 billion gallons of heating oil per year.

In addition, a significantly larger market would be available if expanded to smaller farms: over 90% of all the cows in the U.S. are on farms smaller than 2,000 head. However, in order for energy production to be cost-effective on such farms the manure from these farms would be combined for use in larger, centralized facilities. In this way smaller farms can also benefit from economies of scale and the other benefits accruing to larger-scale systems. Without support, however, today's transportation costs could limit their opportunities to participate.

Processing manure and other materials by AD also creates significant environmental benefits, including greenhouse gas emissions reductions, as methane that would otherwise have been released into the atmosphere is captured. Note that methane is 18-21x more powerful a greenhouse gas than CO₂. Other air quality improvements include significant reductions in odor, ammonia and particulates. Utilizing AD also generates water quality improvements, including reduction of excess nutrient run-off—such as occurs with phosphates, nitrates, and BOD materials, and help to farmers in addressing significant water pollution challenges. In addition, the systems produce value-added products. Each one million gallon digester would also generate 100 tons NH₃; 153 tons P₂O₅ and 184 tons K₂O fertilizers, as well as approximately 10 cubic yards of bedding, compost or mulch. At full development of the potential AD to Energy market, these value added products would equal over 500,000 tons of NH₃, 800,000 tons of P₂O₅, 900,000 tons of K₂O and 52,000 cubic yards of bedding, all per year. Note also that many of the synthetic products such as fertilizers that would be replaced by the residuals from AD energy production are themselves produced from petroleum.

These projects bring significant economic benefits to the areas where they are built, normally in rural often isolated regions. Although we realize that real "economic gain" is not part of the Congressional scoring process, we believe it is extremely important to point out that, based on our experience we conservatively esti-

mate approximately \$3 to \$30 million dollars in direct development and construction investment as well as annual direct spending of up to \$2.5 to \$4 million per year. Applying the standard 5 to 1 multiple to account for the “ripple effect” of regional economic impact, we estimate construction period impact in each project area of \$15 to \$150 million and annual extended economic impact of up to 20 million. Specifically we expect large, eight-tank AD projects such as the one in Stephenville, TX to incur about \$2.5 million in annual direct spending with a \$12–15 million ripple effect and about 1/8 of that on smaller projects like our AD at the Norswiss farm in Wisconsin. These are big impacts in the generally small regional communities where they are located.

A variety of renewable (as well as non-renewable) fuels receive Federal Government assistance. This government assistance is expressed in a variety of terms, depending on the fuel and/or end product produced, such as per gallon of fuel produced, per kwh of electricity generated, etc. In order to compare these subsidies, it is useful to express them all in terms of dollars of subsidy per units of energy (mmbtu) produced. When viewed in this manner, it is apparent that renewable liquid fuels receive greater support than others. For example, biodiesel produced from agri-fuels receives approximately \$8.55 per mmbtu; ethanol receives \$6.16; and biodiesel from waste oil receives 4.27. On the other hand, generating electricity from renewable sources, such as wind or solar, receives substantially less, in a range of 2.57 per mmbtu.

Biogas is akin to a renewable liquid fuel and, from a support perspective, should be treated similarly to biodiesel and ethanol:

- *Biogas and biodiesel are derived from the processing of similar feedstocks.*
- *Renewable liquid and gas fuels have more flexible end uses:* pipeline delivery as a fossil fuel alternative in industry and homes, local applications as a fossil fuel substitute, or power generation.
- *Liquid and gas fuels are efficient from a micro perspective.* Producing electricity from a liquid or gas fuel results in significant energy losses. For example, only 35% or so of the energy content of a fuel ends up as electric power. The rest is wasted as lost heat.
- *Liquid and gas fuels are efficient from a macro investment point of view.* For example, because wind generates power intermittently (only when the wind blows), utilities must also keep available significant extra generation capacity fired by conventional fossil fuels. Digesters, in contrast, run 24 hours per day, 7 days per week.

In sum, the production and use of biogas as a replacement for fossil fuels could potentially provide numerous benefits such as:

- Use of biogas as a replacement for significant quantities of fossil fuels and deliverable via conventional fuel distribution infrastructure
- Reduced greenhouse gas emissions
- Potential reduction in criteria air pollutant emissions
- Improved water quality through better manure management Less dependence on declining fossil fuel supplies
- Better energy security (through a reduced dependence on imported energy), and
- Stimulation of rural economies

These are benefits to society rather than merely financial benefits for the farmer who produces the biogas. Consequently, it is appropriate for the government to provide support for the development of the biogas industry, an industry that did not exist when legislation was written for other renewable fuels.

If the biogas industry is to prosper, government must help launch policy initiatives that will provide the same direct financial incentives or tax credits that are now earned by programs that focus on renewable ethanol, biodiesel, and electricity.

Three areas are key:

- Monetizable production tax credits for biogas from certain renewable feedstocks.
- A counter-cyclical safety net for biogas producers and their lenders.
- Transportation incentives for biogas production for small operators.

We look forward to working with the Committee, and I would welcome you to visit our facilities around the country, particularly in Texas, where we are delivering RNG (our trademarked substitute for natural gas) to the pipeline. Thank you for your careful consideration and support.

Statement of FuelCell Energy, Inc.

FuelCell Energy, Inc. (FCE) appreciates the opportunity to submit this statement to support the extension and expansion of the current tax credits available for fuel cells. FCE (www.fce.com) is the leading fuel cell manufacturing company with headquarters in Danbury, Connecticut that produces and sells fuel cell systems. We currently have over sixty units in operation worldwide that have generated approximately 155 million kilowatt hours of electricity.

Fuel cells are ultra-clean systems that produce power at very high efficiencies, at scales ranging from a few kilowatts per installation to multi-megawatt power plants. They are applicable to both distributed generation and central station power and can also operate in a cogeneration mode that uses waste heat from the system. Our fuel cells operate on a variety of fuels including natural gas, gasified coal, digester gases from waste treatment facilities, other biofuels and hydrogen. Their versatility, efficient operation and superior environmental characteristics make them a very desirable alternative to conventional fossil fuel fired power systems.

As with many new technologies, capturing sufficient order volume to lower product costs is the remaining challenge for large-scale deployment. Consistent and robust incentive programs are essential to facilitate the order volume that is necessary to drive down product costs. The resulting order volume will generate thousands of new, high quality, manufacturing and engineering jobs in the U.S.

This Committee recognized both the environmental and efficiency benefits of fuel cells as well as the need for incentives to accelerate their commercial introduction through enactment of the Section 48 fuel cell investment tax credit included in the 2005 Energy Bill. FCE appreciates the Committee's action in this regard. In combination with state-level incentives, FCE has been able to complete agreements for the installation of fuel cells in a handful of states that offer such incentives, particularly California. As a result, states with fuel cell incentive programs and high cost power are the early target markets.

The fuel cell industry is in a position to provide very-high efficiency, low greenhouse gas power in both distributed and central station power applications with a minimum of environmental emissions. Continuing and improving the tax incentives originally provided by this Committee is in the best interest of our nation as it strives to reduce the environmental impact of electricity generating technologies, reduce overall energy use and dependence on foreign sources of energy. Therefore, FCE recommends that:

- The ITC be increased to \$3,000 per kilowatt
- The ITC be extended for a minimum of 5 years, and
- Enable fuel cell users to claim both the ITC and the renewable energy PTC for electricity from biomass sources.

In order to compete nationally in the near term, fuel cells must receive an equivalent incentive in states where they are not currently available. Our experience, based on incentive levels in California, indicates that an investment tax credit of \$3,000 per kilowatt is necessary. Such a credit will allow for a comprehensive base of fuel cell installations across the country instead of those few locations that provide state-level incentives. It will provide a significant increase in the volume of fuel cell sales, which in turn will allow fuel cells to be cost competitive with conventional, more polluting technologies.

In addition, FCE requests that the ITC provision be extended for at least five years. Such an extension will allow for rapid growth of the fuel cell industry. An extension will allow for the development of healthy markets and capital investment in production facilities to serve those markets. In addition, the extension would avoid the boom and bust cycles that occurred with other technologies as a result of short term tax credits.

Finally, FCE understands that if an entity opts to take advantage of the ITC it may not use the Production Tax Credit (PTC) available for electricity produced using biofuels. Removal of the prohibition on using both credits would promote the use of environmentally friendly biofuels for renewable applications such as fuel cell based power generation. FCE has several installations running on digester gas and would benefit greatly in this market if this prohibition is removed.

Thank you for your consideration of these matters. Please contact me with any questions you may have.

Statement of Jerry Whitfield, PhD.

Mr. Chairman and Members of the Committee, the Biomass Investment Group (BIG) of Gulf Breeze, Florida, appreciates the opportunity to submit this statement for the record on the potential role of the "closed-loop" biomass tax credit in helping to achieve our nation's energy security and environmental policy objectives. We at BIG are very excited about the possibilities associated with this technology, and urge the committee to extend the placed-in-service date window for the "closed-loop biomass" production tax credit for at least five years.

The term "closed-loop biomass" was coined to describe the production of energy from a dedicated biomass crop. The "loop" refers to the balanced and sustainable planting, growing, and harvesting of the biomass crop, its transformation into electrical energy, and finally, the redistribution of remaining ash over the plantation as a fertilizer for further plant growth. As described below, the use of a dedicated crop potentially provides a number of energy and environmental benefits, including displacement of fossil fuels for production of electricity by renewable biomass derived fuels, and absorption of atmospheric carbon via photosynthesis and carbon sequestration in the roots of the plants. In addition, there are energy and environmental benefits from the increases in facility efficiency due to the ability of the operation to control the type and condition of the feedstock. In the context of this testimony, "closed-loop" refers specifically to the Internal Revenue Code Section 45(c)(2) definition "any organic material from a plant which is planted exclusively for purposes of being used at a qualified facility to produce electricity."

As you know, the closed-loop biomass production tax credit was enacted as part of the Energy Policy Act of 1992. At that time, electricity production from a closed-loop biomass process was not economic, and no closed-loop facilities existed. Since the early 1990's, to the best of our knowledge, no production tax credits for electricity from closed-loop Section 45 biomass electricity production tax credits have ever been claimed (there may be some current activity associated with the co-firing of biomass with coal, which has a separate definition in the tax code).

Until recently, one of the most significant technological hurdles facing prospective closed-loop developers involved finding a way to efficiently convert the feedstock into an intermediate liquid biofuel that could subsequently be transformed into energy. Another hurdle that vexed entrepreneurs involved the search for a feedstock that would grow rapidly enough to keep a baseload power facility stocked with fuel from an economically sized farm. As I will describe, we at BIG believe that we have developed solutions for these two challenges that will allow our facility to be very efficient in transforming the feedstock into electricity, thereby making it more economical, and we also have identified an energy crop that can generate the tons of raw biomass necessary to keep our turbine in operation 24 hours a day, 7 days a week, year round.

Although we have made great strides in bringing the cost of our green, renewable electricity closer to being competitive in the market, we will not be able to further narrow that gap until we have gotten a first commercial facility up and running. After the flagship plant is placed in service, and after the period wherein the plants grow mature root systems, we will doubtless spend several years perfecting the process to allow us to obtain the maximum amount of energy from each ton of biomass fuel.

As you might guess from the above discussion of our infant technology, the availability of the production tax credit is an absolutely essential ingredient in our plans. One of the impediments to convincing the financial community to partner with us in building this first facility is the recent trend wherein Congress provides one- or two-year extensions of tax credits. These extensions are not sufficiently long to allow taxpayers to design, finance, and build a groundbreaking commercial facility. Five years is a more realistic timeline. Therefore there has never been a period of certainty within which an investment decision on this type of plant can be made knowing that PTCs will be available when the plant comes on-line. As you can see, these short extensions, relative to the timeline for building such renewable energy facilities, appear to be counterproductive to the original intention of these production tax credits, namely promoting the development of renewable biomass energy.

Since this is all new technology, I will provide some details of our plans. BIG is developing the first commercial scale, farm based, closed-loop biomass-to-electricity plant in the U.S., using a dedicated farm energy crop as fuel. The facility will be located in South Florida, where the climate is suitable for year round growing and harvesting, enabling continuous base load electricity production. Without a long-term extension of the Section 45 closed-loop biomass production tax credit, I can assure you, we will not be able to obtain the financing necessary to get this first facility built.

Our facility is designed to produce 130 MW of electricity from a high yielding energy crop known as E-Grass™ requiring 18,000 acres of cultivation and providing electricity for over 80,000 homes. This crop is a perennial plant and after initial planting and grow-out, only requires harvesting and hauling to the centrally located fuel processing and power plant facility. The fuel conversion utilizes a fast pyrolysis process to produce a combustion turbine grade liquid bio-oil from the E-Grass™ feedstock. Electricity is produced from an integrated combined cycle power plant for optimum power generating efficiency.

We believe that this type of facility could play a critical role in reducing the nation's dependence on fossil fuels, eliminating atmospheric carbon emissions from electricity production, and helping to create jobs and boost the economy of our farmers. Importantly, this biomass-to-electricity power plant model has significant environmental attributes. It will save 930,000 tons of CO₂ emissions per year compared to the same size coal-fired power plant, or 440,000 tons of CO₂ from a natural gas-fired plant. Indeed, the integrated farm and power plant process will be CO₂ negative since although the crop will absorb the same amount of CO₂ as released by the power plant, the below-ground biomass (rootstock) will sequester additional CO₂ over the 20+ year life of the crop. Air emissions will meet all air quality standards for this type of facility. Mineral matter (ash) absorbed by the crop during growth will be recovered during the fuel conversion process and returned to the farm as a soil amendment, thus completing the "loop."

BIG has successfully secured a Power Purchase Agreement with Progress Energy of Florida to purchase 100% of the power produced for a term of 35 years (including extensions). The project is planned to be placed in service in 2010. Design and development of this facility is well underway, but it will not be built unless investors are certain that the facility will be eligible to receive the PTCs under the placed-in-service date window.

I urge this committee to extend the qualifying period for the Section 45 closed-loop biomass energy production tax credit by at least five years to enable developers of this type of technology to make investment decisions with the knowledge that these important incentives will be in place when such a facility comes on-line.

Again, we appreciate the opportunity to provide this information. If Members, or staff, have any questions regarding the technology, we would be pleased to serve as a resource to the Committee on closed-loop biomass issues.

Statement of Karen K. Sisk

My story, as sent to Senator Kit Bond, MO.:

I, Karen K. Sisk, have an income from Social Security. Disability that does not allow me extra funds to pay 100% of my medications in the donut hole (reached 4/1/2007). In 2006, I spent co-pays through my donut hole period. There is no longer a donut hole coverage in 2007.

My income is above the % of poverty and I have no assets, thus the system at present is determining my fate. Changes in poverty guidelines developed in the 1950's, along with cost of living in past 5 years (food, gas, taxes) has soared, but poverty limits remain almost the same and are based on family feeding plans of the 1950's. Along with increases in pharmaceutical and health care costs, now I am being told if I don't pay my medical bills in 10 days—I will not be served by my doctors of 14 years.

I am a nurse (professional), diabetic and injured at work lifting a patient. Prior to 2006 Medicare Part D, I was being supported by Pharmaceutical Assistance Programs. As of 2006 Medicare Part D, I am not covered because I have Medicare Part D. Now, Medicare Part D will not cover me in donut hole. Without medications I will DIE!

Do I live on the street?

Take my Medicines?

Not eat?

Go into Diabetic Shock!

Sure sounds like Euthanasia of future Baby Boomers!

1) Change poverty guidelines—Update to today 2007, Standards.

2) Find solution for (professionals) with higher Social Security & no assets—to be able to eat—take medications and encourage corporations to utilize (their) minds without having to use physical labor.

3) I don't know what. . . .

I have served on the Board for the East Missouri Community Action Agency for 2 years, Jefferson County Missouri: Disabilities Support Systems for 3.5 years, Greater Mineral Area:

Emergency Food & Shelter Program for 2 years, Madison County Advisory Council for the EMAA for 2 years, Madison County Council for the Developmentally Disabled for 2.5 months. Poverty guidelines vary for each agency that is available for emergency assistance, as well as, each agency filing the same papers over and over again (? decrease in paperwork act / not for those in poverty.

Why can't there be a clearing house for original background paperwork, that these other agencies (pharmaceutical companies, community action agencies, service providers that use sliding scales . . .) can be referred to, for this information.

In the past 2 weeks, I have filed the same papers to 16 different agencies.

I have been trying for the last month to receive a copy from my Part D carrier stating that I have reached the donut hole. This is necessary to ask for assistance from the pharmaceutical companies.

I have been given many misinformed, as well as, out right lies that this paper would be there in three days. I will be without medications by next week.

After contacting **The Department of Senior Services** and they did not know to whom they should refer me to >>>>>

I called **Rod Jetton's Office, Speaker of the House of Representatives in Missouri**, about this. >>>>>>>

I was referred to the **Southeast Missouri Area on Aging** and they were told by **Community Care RX** that they will get that in the mail as soon as possible. We are still waiting!

I informed these offices, if need be, they might just see me on the front steps of the the Jefferson City Courthouse waiting to die—over the next few months.

I know I am not the only one in this situation. Most Poverty individuals do not have the resources, education and persistence to do this or the computers to write their responses to committees such as you.

Many improvements can be made, to access healthy affordable living, empowering jobs that don't require you to work 2 more jobs to support your family, and a campaign to educate people on the utilization of resources such as; Vocational Rehabilitation Programs for those with learning disabilities so they can get a suitable job

. . . I draw a social security check 1,234.00 net each month and have took on a part time job, 2/2006, at Movie Gallery (8–10 hours/week, minimum wage/260.00per month in 2007) to help me pay co-pays for my medications.

It was still inadequate, the funds I made were 300 shy of the cost for that year, "with coverage in the donut hole". My medication costs per month were approximately are \$2,400.00.

With the use of MO RX program that becomes \$1,200.00. Prices under Part D have increased since 2006 and coverage under donut hole is nonexistent.

When President Lincoln chose "The" Woman to develop the Dept. of Health and Human resources in that era I doubt that either one of them could foresee what the situation is today.

Or for that fact, "The" Woman who developed the Nutritional and Poverty guidelines in 1950's.

Speaking of Women, Dr Donna Marie Beagle, Ed.D., a child of homelessness and poverty, speaks today on "See Poverty . . . Be The Difference!" and has written a book on this.

She, EMAA, many other community action agencies through out the state, myself and other individuals who are interested in stopping poverty in these "here" United States are meeting at the steps of Jefferson City, Courthouse on May 2, 2007 to speak to legislatures. All are invited.

Come to the "SHOW ME STATE" and let's lay down some foundations for institutional and systematic change.

Statement of National Rural Electric Cooperative Association, Arlington, Virginia

Clean Renewable Energy Bonds

I am pleased to provide testimony today about a program of great importance to the members of the National Rural Electric Cooperative Association—the Clean Renewable Energy Bond. I would like to start by thanking Congressmen Earl Pomeroy (D-ND) and Ron Lewis (R-KY) for introducing H.R. 1965, which provides for addi-

tional funding and the continuation of the CREBs program. I would also like to thank Congressmen McDermott (D-WA), Ramstad (R-MN) and many others on the Committee for their strong leadership on and support of the Clean Renewable Energy Bond.

Background on electric Cooperatives

NRECA is the national service organization representing the interests of cooperative electric utilities and their consumers. In addition to advocating consensus views on legislative and regulatory issues, NRECA provides health care, pension, financial investment and many other programs for its members.

Electric cooperatives are not-for-profit, private businesses governed by their consumers (known as “member-owners”). Today, 930 electric cooperatives serve 40 million consumers in 47 states. Cooperatives are a unique sector of the electric utility industry, serving an average of only 7 consumers per mile compared with the 35 customers per mile served by investor-owned utilities (IOUs) and 47 customers per mile served by municipal utilities. To put this in greater perspective, electric cooperatives serve only 12% of the population—but maintain 42% of the nation’s electricity distribution lines covering three quarters of the land mass. Cooperative revenue per mile averages only \$10,565, while it is more than six times higher for investor-owned utilities, at \$62,665 and higher still for municipal utilities, at \$86,302 per mile. In summation, cooperatives have far less dollars than the other electricity sectors to support much more of the distribution infrastructure. In addition, electric cooperative households generally have less income than the rest of the nation, with nearly half of the cooperative service territories suffering poverty rates that are higher than the national average.

These numbers illustrate why bringing power to rural areas is a costly endeavor, resulting in electricity prices that are often higher in cooperative service territories than those served by IOUs. The key to success in bringing the most reliable and affordable power possible to these low density areas lies in the cooperative business model. The term “cooperative” has been described by Federal court decisions and IRS rulings and pronouncements. The IRS requires that businesses adhere to the following guidelines to qualify for cooperative status:

1) **Subordination of capital.** Most benefits of the cooperative must remain with members. The cooperative is not to be operated for the primary purpose of paying a return on investment.

2) **Democratic control by the members of the cooperative.** Each cooperative is run by a board of directors elected by the entire cooperative membership. Votes are on a one member, one-vote basis.

3) **Operation at cost.** Costs must be fairly allocated to all members. Any revenue that is collected from members above what it costs to operate the co-op plus retain a reasonable margin for future needs is returned to all members on an equitable basis. In the case of electric cooperatives, net margins returned to members are referred to as “capital credits.”

To sum up these requirements, the cooperative’s benefits must flow to its member-owners. Any benefits received from the Federal Government, therefore, also flow to the cooperative’s consumers. Although most electric cooperatives are exempt from federal income tax, all electric cooperatives pay state and local property taxes, sales tax and payroll and excise taxes—\$1.09 billion in 2003.

Electric Cooperatives and Climate Change

Electric cooperatives increasingly seek to provide safe, reliable and affordable electricity generation to their consumers. They are investing in technology such as renewable generation to reduce their emissions. This generation augments coal, nuclear, hydropower and gas generation that is necessary to provide output of sufficient scale for the growing economy. It should also be noted that intermittent generation from wind or solar energy would cause an unreliable grid if not backed up with these conventional resources, which unlike wind, are able to provide electricity on demand 24 hours a day. Renewable energy (not including renewable hydropower) accounts for only two percent of the current generation mix in the U.S., and the need for that renewable energy is growing along with the need for all other types of generation as our population, particularly in rural America, grows. The attached chart (chart 1) displays the current U.S. generation mix.

This Committee has been considering how tax policy fits with meeting the goals of addressing climate change. I submit that tax incentives that drive energy technology are among the most important programs Congress will establish to meet climate change goals. Electric cooperatives support the goal of reducing carbon emissions if it is an economy-wide goal, maintains fuel diversity, protects the economy from significant negative impacts and does not result in regressive income impacts

on lower and middle-income households. In addition, any climate change plan should recognize that new technologies, including the capture and sequestration of carbon dioxide from power plants, will be critical to addressing this issue. But cost-effective, commercially-available technologies are still more than a decade away from large-scale commercial applications. This is where tax policy can play a role to accelerate the research, development, demonstration, and commercialization of new technologies. Tax incentives should be available to all segments of the utility industry—including incentives tailored to cooperatives—for advanced electric generation, transmission, and distribution technologies.

With respect to potential climate goals, the Electric Power Research Institute, which provides technological research to the electric utility sector, has identified the need to bring *all* potential energy resources, efficiency measures and technologies to bear as they each hold only a part of the potential needed to reduce U.S. carbon emission intensity (CO₂ emissions per MWh). Note that the utility sector is responsible for just over a third of all of the nation's CO₂ emissions. Using the Energy Information Agency's Annual Energy Outlook 2007 as a base case for carbon emissions over the next 25 years, EPRI calculated the CO₂ reductions that would result from reasonable but aggressive deployment programs in seven specific areas. The attached chart (chart 2) shows the role that renewable energy, efficiency, advanced coal, nuclear and other technologies could play *if* certain technological advances are assumed. Note that an economic analysis of the costs of pursuing these is not included in the chart and has not yet been produced by EPRI, but as utilities, it is mandatory that we balance the need for new technologies against affordable rates for our member owners.

There are many details of a carbon reduction program that will need to be addressed as Congress develops a bill, and cooperatives will be actively engaged in the debate over how to structure a program to reduce greenhouse gas emissions.

Electric Cooperatives and Alternative Energy

One of the details of a climate proposal will be the development of tax incentives for alternative energy. With respect to renewable energy, twenty-two states have approved renewable portfolio standard mandates that require most utilities to offer a certain percentage of renewable energy. Coupled with the need to avoid carbon emissions when possible, the need to for utilities to develop all available renewable resources is urgent. Currently, renewable energy makes up almost 11 percent of the electricity provided by electric cooperatives. The majority of that 11 percent is from large scale federal hydropower, although more than 500,000 megawatts come from non-hydroelectric renewable capacity.

More than 750 coops (80% of the cooperative industry) offer "green power" programs that enable consumers to buy renewable output from the marketplace. Almost all of this power is currently purchased from federal hydropower facilities, the market or through contracts with developers. Yet, electric cooperatives are ideally situated to develop renewable projects in their back yards. Those projects have not yet been fully realized because of a historic market barrier: given their not-for-profit business model, electric cooperatives have not been able to directly utilize traditional tax incentives like the Production Tax Credit. The capital costs for renewable generation remain much higher—two to ten times more expensive—than conventional resources. Such incentives remain necessary, therefore, to bring renewable generation on line at a cost that is affordable for consumers and to push technology to make the resources more efficient and effective.

Incentives enable utilities to bring alternative generation resources on line despite their higher capital costs. Small in size with few consumers per mile, electric cooperatives can't hide high prices for generation or push costs off onto shareholders. Electric cooperatives return revenues in excess of what is needed for generation and electricity delivery back to their consumers. By the same token, electric cooperatives must flow the costs of any generation to consumers through rates, and every member bears those costs. Keeping rates affordable and the delivery of energy reliable is our key mission, and locally-elected boards of consumer directors hold electric cooperatives accountable to that mission.

The Energy Policy Act of 2005 recognized that incentives, particularly tax incentives, take center stage among federal policies that foster technology development. For example, EPACT extended the Production Tax Credit (PTC) that provides up to a 1.9 cent per kWh incentive for development of wind, geothermal, hydropower, biomass and other renewable resources. Electric cooperative consumers indirectly benefit from the PTC by purchasing renewable power from IOUs and developers to the extent that they can negotiate with the producers to pass along some of the PTC benefits in lower power costs. The PTC does not, however, provide electric cooperatives with an incentive or subsidy needed to develop resources in their back yard.

To address this concern, Congressmen Pomeroy and Lewis sponsored legislation in 2005 that was attached to EPACT and created an equally important new program, the Clean Renewable Energy Bond. The bill had 80 bipartisan cosponsors in the House, and the program was also strongly supported by then-Finance Committee Chairman Charles Grassley and Ranking Member Max Baucus. The program recognizes that not-for-profit electric cooperatives, generally exempt from tax at the federal level, should receive an incentive similar to those available to investor-owned utilities and for-profit developers.

I would note that EPACT also provided an investment tax credit for advanced pulverized and IGCC coal, and a Production Tax Credit for advanced nuclear resources. Unfortunately, federally tax-exempt electric cooperatives do not have an opportunity to put those incentives to use. At the same time, because their significant generating capacity is sized to keep pace with our growing communities, applying advanced coal technologies and nuclear generation resources stands to make the biggest impact on reducing carbon emissions. Today, electric cooperatives do not have the opportunity that other sectors do to invest in these technologies. We would like your help to ensure that any future energy tax bill will include financing mechanisms that electric cooperatives can use for advanced clean coal and nuclear generation in addition to renewable energy.

The Clean Renewable Energy Bond Program

I want to now focus my testimony on our experience with the Clean Renewable Energy Bond (CREB) program. Although the program is in its infancy, it has proven to be a highly effective way to bring new renewable projects on line. The CREB program is as successful as the PTC in getting new renewable resources in the ground, as electric cooperatives alone flooded Treasury with more than \$550 million in applications for 83 projects in 22 states. In addition, electric cooperatives have proven that given the necessary incentives, they will tap available renewable resources.

The program in its first year funded 78 electric cooperative projects and was well balanced across many technologies, including wind, biomass, landfill gas, hydro-power and solar. The award size of cooperative projects ranged from \$120,548 to \$31 million.

The attached map shows the distribution of these projects across the country (chart 4), and the bar charts show the numbers of applications by technology (chart 5). The electric cooperative set aside worked well to ensure that cooperatives could build utility scale projects and the program would be balanced between electric cooperatives and government applications.

The only significant "complaint" co-ops have with the program is that the volume cap is not sufficient to fully fund all of the worthy applications. 800 million was provided to last for two years, with 300 million set aside for electric cooperatives. Yet Treasury received 2.5 billion in applications in the first year overall. Electric cooperatives submitted more than \$550 million of those applications, but received only \$300 in bond allocations due to a program size that was too small overall. An additional \$400 million, with \$150 million set aside for electric cooperatives, was provided under the Tax Relief and Health Care Act of 2006, but this still does not fully fund the program. In contrast, there is no volume cap for the PTC.

In order to address this problem, Congressmen Lewis (R-KY) and Pomeroy (D-ND) have introduced a bill, H.R. 1965, to make the program annual and provide an increase to 1 billion in funding each year. The same proportionate set aside, \$375 million, is available for electric cooperatives. While applications may still exceed this mark, annual certainty about funding at a \$1 billion level will help to ensure that more projects, including larger utility scale projects, can be financed. The bill makes a few additional technical improvements to the existing program.

I urge this committee to include the Pomeroy-Lewis bill in any energy tax bill. The provision fits hand in hand with the Production Tax Credit, ensuring that electric co-ops, which are ideally situated to develop renewable generation, can also help tap this nation's renewable potential for electricity production. I also urge the committee to extend the Production Tax Credit as it provides the option for our members to purchase renewable energy affordably from other providers, wherever it is necessary.

CREBs are an Important Part of Cleaner Generation in the Future

In conclusion, I commend this Committee for its past and current support of the Clean Renewable Energy Bond and Production Tax Credit programs. Incentives are the key to cooperatives realizing their goal to provide clean, affordable generation to their member-owners. Tax policy, including incentives available to all utility sectors, will play a central role in ensuring that all available renewable resources are developed and all consumers can access advanced coal and nuclear technologies.

Ultimately, tax policy can help to make feasible new technologies that address carbon emission but are not currently commercially accessible. We are pleased that the Committee has recognize the important role that not-for-profit electric cooperatives and their consumers will play in our energy future with the CREB program, and look forward to working with you on future proposals that will shape the nation's energy policy.

CHART 1

U.S. Generation Mix

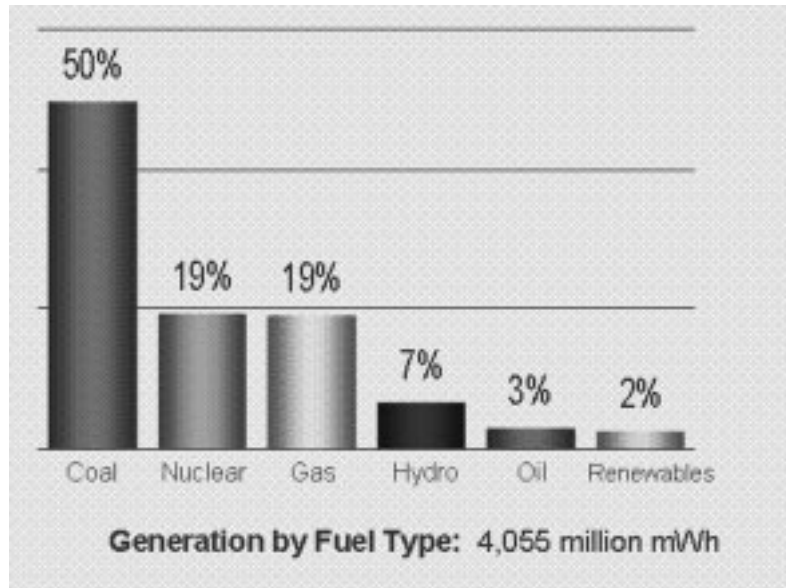
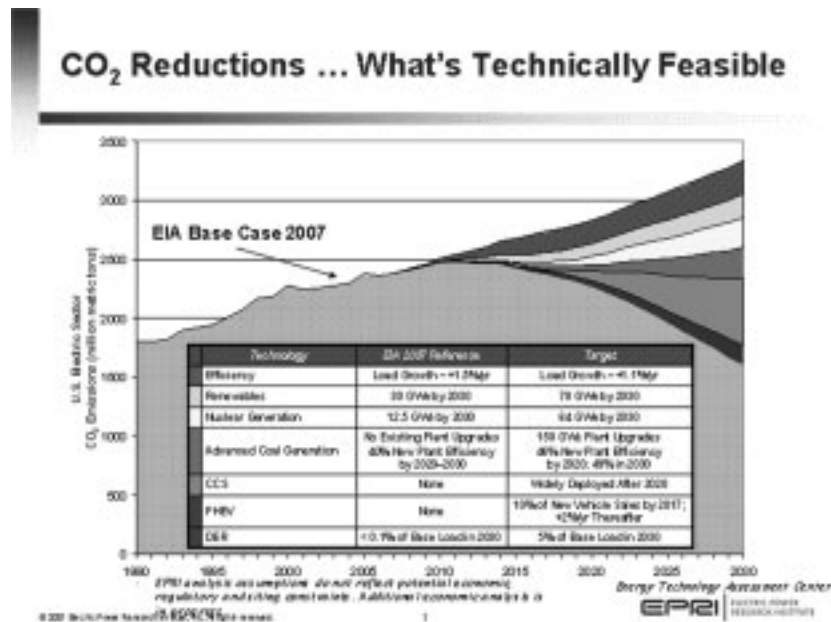


CHART 2



CCS—Carbon Capture and Sequestration
 PHEV—Plug-in Hybrid Electric Vehicles
 DER—Distributed Energy Resources

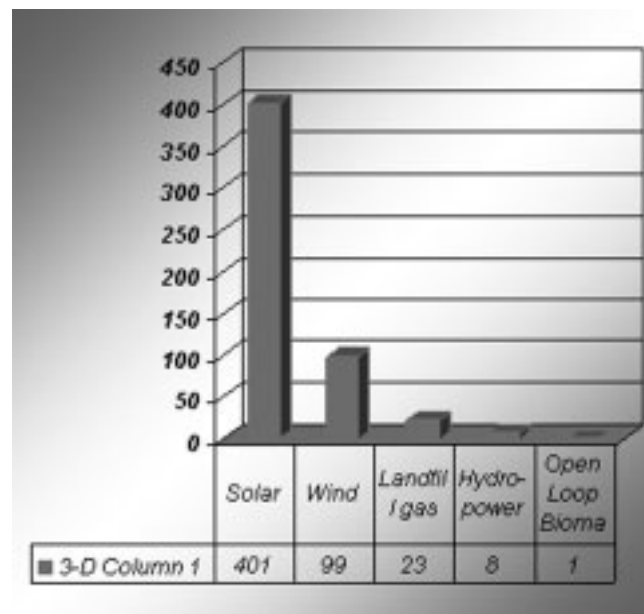
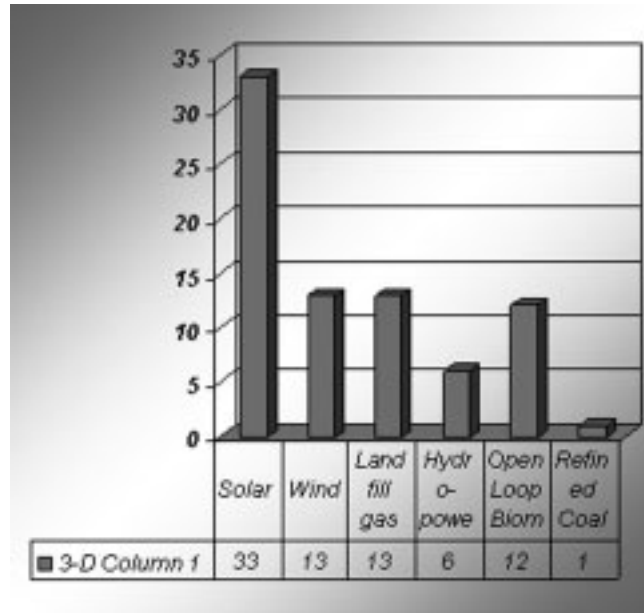
CHART 3



Note that grey icons are applications not awarded.

CHART 4

Number of Projects Approved, By Technology
 Government Projects Co-op Projects



National Venture Capital Association
April 19, 2007

The Honorable Charles B. Rangel, Chairman
 House Committee on Ways and Means
 1102 Longworth House Office Building
 Washington, DC 20515

The Honorable Jim McCrery, Ranking Member
 House Committee on Ways and Means
 1102 Longworth House Office Building
 Washington, DC 20515

Dear Chairman Rangel and Ranking Member McCrery,

On behalf of the National Venture Capital Association I am writing in support of the proposal to extend and enhance the Investment Tax Credit (ITC) for clean energy technologies. We believe that the Federal Government should dramatically expand financial incentives to drive the market adoption of green energy sources, with mechanisms including tax credits, subsidies, loan guarantees and other programs. In addition, Congress should consider creating incentives for the U.S. greentech companies to manufacture their products in this country.

NVCA recommends that Congress adopt a technology neutral approach that allows the marketplace, not the federal tax code, to pick technology winners and losers. To the greatest extent possible, federal policy should establish a level playing field that enables all promising energy technologies to compete. A long term extension of the Investment Tax Credit that eliminates the caps that currently apply exclusively to fuel cells would render the ITC more effective in the drive to innovate a robust and diverse set of energy technology solutions.

Venture capital investing in "Clean Tech" has more than tripled between 2005 and 2006 and we believe our industry has an important role to play in the energy arena. However, considering the global nature of the energy crisis, we believe that by partnering with the private sector the Federal Government partner can drive U.S. clean energy development.

Sincerely,

Mark Heesen
President

Statement of J. Patrick Boyle, American Meat Institute

Mr. Chairman, Ranking Member, and Members of the Committee thank you for allowing us the opportunity to submit testimony before this Subcommittee. My name is Patrick Boyle and I am president of the American Meat Institute (AMI). AMI has provided service to the nation's meat and poultry industry—an industry that employs more than 500,000 individuals and contributes more than 100 billion in sales to the nation's economy—for more than 100 years.

AMI members include 250 of the nation's most well-known meat and poultry food manufacturers. Collectively, they produce 90 percent of the beef, pork, veal and lamb food products and 75 percent of the turkey food products in the U.S. Among AMI's member companies, 60 percent are small, family-owned businesses employing fewer than 100 individuals and some are publicly traded and employ tens of thousands. These companies operate, compete, sometimes struggle and mostly thrive in what has become one of the toughest, most competitive and certainly the most scrutinized sectors of our economy: meat and poultry packing and processing.

AMI member companies have been carefully observing recent developments in the renewable energy sector, specifically the impacts from the increase in demand for corn from the ethanol industry and the opportunities to contribute to American energy security by producing energy from animal fats, methane conversion, and other means. Of greatest significance in this debate is the rise in demand for corn has pressed market forces to demand higher corn prices. Consequently and among other impacts, the change in price and availability has led animal agriculture producers to consider alternatives to their feeding, nutrition, and dietary regimen. These changes can and do impact meat and poultry quality, consumer offerings, livestock and poultry farm efficiency, and the management of livestock and poultry operations.

It is for these reasons articulated in the following testimony that AMI is asking Congress and the Administration through tax and other legislative vehicles to con-

sider policies to support energy-based opportunities for animal agriculture, minimize adverse impacts on livestock and poultry producers and processors, and ultimately place the United States in a more competitive position in terms of energy security, diversity, and availability. Specifically, AMI supports 1) research in ethanol byproduct safety, quality, and usability and renewable energy technologies, 2) equity of incentives for all renewable energy including renewable diesel, biodiesel, and methane conversion, 3) a working lands conservation program to encourage environmentally friendly feed stuffs production, and 4) supports exposing consumers to more renewable fuels by allowing the ethanol tariff to expire.

Feed Impact on Meat and Poultry Production and Consumption

Corn is one of the largest components in the diets of livestock and poultry. Swine rations often contain about 60–85 percent corn, poultry rations contain about 65–75 percent, and beef animals often have diets averaging 35 to 65 percent shell corn—although some producers will feed 100 percent corn to beef animals as either shell corn, flaked, or silage. As a result of a significant increase in ethanol production, animal nutritionists are being confronted with a new challenge in attempting to incorporate a significant amount of ethanol's byproduct or distillers grains into existing feed rations and maintain meat and poultry quality and the economic well-being of livestock and poultry producers.

As background, the process of corn milling for ethanol creates a byproduct called 'distillers grain' with nutrient profiles that are very different than corn. For example, corn dry matter is approximately 60–70% starch. When starch is harvested to produce ethanol it concentrates protein and fiber, and fundamentally alters the level and dietary availability of key minerals and essential amino acids in the remaining distillers grain. If livestock and poultry producers want to incorporate distillers grain in their nutrition plan, they need to account for these differences in nutrition to keep the ration in balance with animal requirements and avoid overfeeding specific minerals. However, there are some drawbacks to supplementing feed with distillers grains. Initial research has demonstrated that animal performance measured by weight-gained/day, meat yield, leanness, environmental impact (manure production), and other factors have provided initial indicators that livestock and poultry on distiller grain rations have underperformed their corn-rationed peers.

Livestock and poultry producers manage their animal nutrition programs to maximize the daily conversion of feed into muscle protein and ultimately quality meat and poultry products. Animals fed an optimal ration will produce the highest quality meat and poultry in a limited period of time—all carefully balancing, protein, fat, tenderness, weight, muscle density, and other quality considerations in the final product. However, feed that converts slowly into protein requires livestock and poultry producers to market fewer animals, handle more waste, and reduce the overall productivity and efficiency of the farm. Thus, if the nutrient content of the feed is unbalanced, the livestock and poultry marketed may also yield less lean meat, contain more fat, or produce a lighter animal—all very negative impacts for livestock and poultry producers, processors, and consumers.

The very high fiber content, nutrient variability, limited digestibility, and different mineral profile of distiller grains are the key limiting factors of its ability to be used as a substitute for corn. Swine and poultry in particular have difficulty digesting high fiber feed. By comparison, corn contains on average 1.95 percent crude fiber, whereas distillers grain contain between 4 and 12 percent crude fiber. For this reason and others, rations for poultry are limited to as little as 10 percent distillers grain. Swine, in some cases, can feed up to 20 percent distillers grain, and cattle can be fed up to 45 percent the normal corn ration. Higher levels of incorporation with current animal nutrition supplementation can occur, but will risk lowering meat and poultry quality, animal health, or adversely impacting farm management.

Therefore, federal research investment in applied meat and poultry nutrition could provide livestock and poultry producers with tools and supplements to help adjust their feeding regimen to incorporate distillers grains and other byproducts more easily. A number of very reputable studies on distillers grain impacts have been done. However, animal agriculture producers are in need of dietary solutions that they can employ on their farming and production operations. Research can also offset other challenges of distillers grains include the high degree of nutritional variability from plant to plant and its storage and transport problems.

Policy Recommendations

Given the nutrition and handling limitations with distiller grains and the challenge of corn demand and its availability, AMI asks that Congress consider providing federal research funding on broad-based applied research initiatives into renewable energy technologies, economics, and byproduct safety, quality, and usability

(i.e. storage and transportation). Directing research on these topics will ideally provide animal agriculture producers with needed animal nutrition guidance for producing safe and high quality meat and poultry products.

The meat and poultry industry has been investing for years in farm level nutrition and management research to improve the safety and quality of meat and poultry. Livestock diets have been shown to impact microflora in the gut. It is encouraging that USDA monitoring data and the Centers for Disease Control (CDC) illness data indicate that the meat and poultry industry has made measurable and significant food safety improvements.

With the broad based introduction of distillers grains into the diets of livestock and poultry, it is critical for us to understand its impact on microflora and, in turn, on meat safety. Similarly, consumers have been continuing to add new meat and poultry products to their diets and shopping carts. Many of these new products are leaner or provide other benefits to our customers. The continued competitiveness of meat and poultry producers is closely tied to producer's ability to provide consistent, high quality animals to our member companies. Congressionally directed research can aid this development.

Broader Energy Considerations

AMI recognizes that this dietary change is largely being driven by an energy policy that has selected certain technologies to advance. It is AMI's perspective that the U.S. and the world need a policy that supports a broad diversity of energy options and renewable energy sources to supply the energy and transportation needs of today and the future. AMI supports alternative fuels and new sources, such as those from renewable diesel, methane conversion, and biogas. Consumers and businesses can benefit from many new energy sources from such raw materials as animal fats, tallow, and animal waste products as their feed stocks as long as the law does not prejudice or unduly favor one feed stock over another.

AMI also supports a working lands environmental approach, which would remove the regulatory and/or legislative restrictions on producers that elect to grow crops on land currently locked in the Conservation Reserve Program (CRP), but still maintain environmental benefits to the land. The benefits under such a system would continue to accrue to the soil, air, and water and provide an abundant base to grow crops for food and energy.

Lastly, AMI views the renewable energy segment as a new and rapidly growing market. There remains a broad need for renewable energy infrastructure and consumer buy-in into this development. To aid consumer confidence in renewable energy and expand the market, it would be in Congressional interest to allow the ethanol tariff on imported product to expire in 2008. This would potentially expose consumers to more renewable energy and broaden the diversity of our energy sources.

Thank you for the opportunity to provide these perspectives today.

Statement of Soap and Detergent Association

The Soap and Detergent Association (SDA) appreciates the opportunity to submit comments on the destructive consequences of biofuel tax incentives on the United States oleochemical industry. SDA is a 110 member national trade association representing the formulators of soaps, detergents, general household and institutional cleaning products as well as the suppliers of ingredients and finished packaging for those products. Among these suppliers are the manufacturers of oleochemicals made from animal fats and oils.

The primary raw material of the United States oleochemical industry is tallow, an animal fat. The industry's economic viability is, in fact, based on the competitive price advantage of tallow vis a vis foreign palm oil. However, because of the substitutability of palm oil for tallow, if tallow's advantageous price differential is lost, the future of a United States based oleochemical industry, and its customers, becomes tenuous.

Unlike corn and soybeans for which plantings can be expanded to accommodate new biofuel applications, tallow production is relatively fixed, usually fluctuating less than 2% from year to year. There is no real elasticity in the tallow supply. Cattle herds are not expanded to produce tallow. It is a by-product, not a crop.

Biofuel subsidies for animal fats undermine the oleochemical industry in two ways. First, they create upward price pressures on the non-expandable, finite tallow raw material pool. Second, particularly as a result of the recent IRS decision expanding the "renewable diesel" tax credit to so-called "coproduction," they now pose the issue of supply availability per se, not just price. This is an untenable and undeserved position for the oleochemical industry and is wholly caused by biofuel subsidies.

Existing biofuel subsidies, including those for ethanol, have created a series of damaging economic incentives favoring the diversion of tallow from long standing traditional uses to fuels. The cascade of incentives began with the tax credits for tallow-based biodiesel in the VEEETEC provisions of the American Jobs Creation Act of 2004. These were followed by a subsidy for the direct burning of tallow as a fuel and finally the “renewable diesel” incentives found in Section 1346 of the “Energy Policy Act of 2005.”

The inherent impact of the renewable diesel provision was compounded in guidance issued earlier this month wherein the Internal Revenue Service held that so-called “coproduced fuel,” where animal and other fats are mixed directly with crude oil going to a cracking tower, was considered to be “renewable diesel” produced by the thermal depolymerization (TDP) process and therefore eligible for the \$1.00/gal subsidy.

Tyson Foods, Inc. and ConocoPhillips have already announced a joint venture to produce such a “renewable diesel” via a “coproduction” process. This type of operation now poses the greatest threat to the continued viability of the tallow raw material pool and, in turn, the domestic oleochemical industry, its customers and the companies which depend on their products.

The renewable diesel subsidies that will be paid to the Tyson/ConocoPhillips enterprise serve to highlight the unthinking, irrational nature of the current biofuel subsidization policy. There is no process for calibrating the subsidy to process costs, no apparent limits on the amount of the subsidy that can be collected by a producer, and no consideration of the impact on other industries. Coproduction renewable diesel is nothing more than a subsidy to large oil companies.

Based on our understanding of the renewable diesel “coproduction process,” it involves little more than commingling the animal fats with the crude oil being fed to a cracking tower.

Taken together, these three subsidy credits create a manifold of incentives capable of diverting tallow away from oleochemical production. For its part, the oleochemical industry receives no subsidies. It has historically purchased its tallow in a classic free market, supply and demand environment. Those traditional conditions have, however, been destroyed by the government’s economic intervention.

The situation is further complicated by the fact that ethanol incentives are diverting corn from traditional livestock feeding operations. This has caused an additional draw down of the tallow pool since tallow, in part, is substituted for the diverted corn in animal feed. Currently, tallow prices are in the \$0.25–0.26 range. Traditionally, tallow prices have been in the low to mid teens. This represents a nearly 60% increase and has every indication of being a sustainable price given the current subsidy structure.

The conditions in the corn market which have led to this new tallow price level are generally viewed as attributable to the confluence of the long standing ethanol subsidy combined with an enhanced renewable fuels standard. This was the perfect biofuels storm, the effects of which have been widely felt and publicized. We must learn from this.

In Illinois, SDA estimates the loss of the oleochemical industry would result in the loss of 1,000 jobs. Illinois is estimated to produce 45–50% of U.S. oleochemicals. Consequently, on a national basis we estimate that 2,000 jobs are at stake. Oleochemicals are, by their very nature bio-based, and always have been.

The true irony of the current situation is that a quiet, traditional, economically sound, Middle American, bio-based industry which never asked government for a thing, stands to be destroyed by a rush to subsidize the economically challenged and technologically unsettled biofuels industry. In SDA’s view, there is no doubt that they can coexist, but not under the current economic conditions created by the biofuels incentives currently in place where by oleochemicals lose.

SDA recognizes that the potential benefit of biofuels to the nation is significant. However, that benefit should not be purchased at the cost of driving a well established, traditional industry out of business.

There must be a balance and the impacts on related industries must be considered before current programs are extended unthinkingly. Biofuel tax subsidies have their victims as well as their beneficiaries. It is essential that the current biofuels tax policy be redesigned to consider its destructive and deleterious impacts on related industries.

Respectfully submitted,

Dennis Griesing
Vice President, Government Affairs

Statement of Jerry Whitfield, PhD.

Mr. Chairman and Members of the Committee, the Biomass Investment Group (BIG) of Gulf Breeze, Florida, appreciates the opportunity to submit this statement for the record on the potential role of the "closed-loop" biomass tax credit in helping to achieve our nation's energy security and environmental policy objectives. We at BIG are very excited about the possibilities associated with this technology, and urge the committee to extend the placed-in-service date window for the "closed-loop biomass" production tax credit for at least five years.

The term "closed-loop biomass" was coined to describe the production of energy from a dedicated biomass crop. The "loop" refers to the balanced and sustainable planting, growing, and harvesting of the biomass crop, its transformation into electrical energy, and finally, the redistribution of remaining ash over the plantation as a fertilizer for further plant growth. As described below, the use of a dedicated crop potentially provides a number of energy and environmental benefits, including displacement of fossil fuels for production of electricity by renewable biomass derived fuels, and absorption of atmospheric carbon via photosynthesis and carbon sequestration in the roots of the plants. In addition, there are energy and environmental benefits from the increases in facility efficiency due to the ability of the operation to control the type and condition of the feedstock. In the context of this testimony, "closed-loop" refers specifically to the Internal Revenue Code Section 45(c)(2) definition "any organic material from a plant which is planted exclusively for purposes of being used at a qualified facility to produce electricity."

As you know, the closed-loop biomass production tax credit was enacted as part of the Energy Policy Act of 1992. At that time, electricity production from a closed-loop biomass process was not economic, and no closed-loop facilities existed. Since the early 1990's, to the best of our knowledge, no production tax credits for electricity from closed-loop Section 45 biomass electricity production tax credits have ever been claimed (there may be some current activity associated with the co-firing of biomass with coal, which has a separate definition in the tax code).

Until recently, one of the most significant technological hurdles facing prospective closed-loop developers involved finding a way to efficiently convert the feedstock into an intermediate liquid biofuel that could subsequently be transformed into energy. Another hurdle that vexed entrepreneurs involved the search for a feedstock that would grow rapidly enough to keep a baseload power facility stocked with fuel from an economically sized farm. As I will describe, we at BIG believe that we have developed solutions for these two challenges that will allow our facility to be very efficient in transforming the feedstock into electricity, thereby making it more economical, and we also have identified an energy crop that can generate the tons of raw biomass necessary to keep our turbine in operation 24 hours a day, 7 days a week, year round.

Although we have made great strides in bringing the cost of our green, renewable electricity closer to being competitive in the market, we will not be able to further narrow that gap until we have gotten a first commercial facility up and running. After the flagship plant is placed in service, and after the period wherein the plants grow mature root systems, we will doubtless spend several years perfecting the process to allow us to obtain the maximum amount of energy from each ton of biomass fuel.

As you might guess from the above discussion of our infant technology, the availability of the production tax credit is an absolutely essential ingredient in our plans. One of the impediments to convincing the financial community to partner with us in building this first facility is the recent trend wherein Congress provides one—or two—year extensions of tax credits. These extensions are not sufficiently long to allow taxpayers to design, finance, and build a groundbreaking commercial facility. Five years is a more realistic timeline. Therefore there has never been a period of certainty within which an investment decision on this type of plant can be made knowing that PTCs will be available when the plant comes on-line. As you can see, these short extensions, relative to the timeline for building such renewable energy facilities, appear to be counterproductive to the original intention of these production tax credits, namely promoting the development of renewable biomass energy.

Since this is all new technology, I will provide some details of our plans. BIG is developing the first commercial scale, farm based, closed-loop biomass-to-electricity plant in the U.S., using a dedicated farm energy crop as fuel. The facility will be located in South Florida, where the climate is suitable for year round growing and harvesting, enabling continuous base load electricity production. Without a long-term extension of the Section 45 closed-loop biomass production tax credit, I can as-

sure you, we will not be able to obtain the financing necessary to get this first facility built.

Our facility is designed to produce 130 MW of electricity from a high yielding energy crop known as E-Grass™ requiring 18,000 acres of cultivation and providing electricity for over 80,000 homes. This crop is a perennial plant and after initial planting and grow-out, only requires harvesting and hauling to the centrally located fuel processing and power plant facility. The fuel conversion utilizes a fast pyrolysis process to produce a combustion turbine grade liquid bio-oil from the E-Grass™ feedstock. Electricity is produced from an integrated combined cycle power plant for optimum power generating efficiency.

We believe that this type of facility could play a critical role in reducing the nation's dependence on fossil fuels, eliminating atmospheric carbon emissions from electricity production, and helping to create jobs and boost the economy of our farmers. Importantly, this biomass-to-electricity power plant model has significant environmental attributes. It will save 930,000 tons of CO₂ emissions per year compared to the same size coal-fired power plant, or 440,000 tons of CO₂ from a natural gas-fired plant. Indeed, the integrated farm and power plant process will be CO₂ negative since although the crop will absorb the same amount of CO₂ as released by the power plant, the below-ground biomass (rootstock) will sequester additional CO₂ over the 20+ year life of the crop. Air emissions will meet all air quality standards for this type of facility. Mineral matter (ash) absorbed by the crop during growth will be recovered during the fuel conversion process and returned to the farm as a soil amendment, thus completing the "loop."

BIG has successfully secured a Power Purchase Agreement with Progress Energy of Florida to purchase 100% of the power produced for a term of 35 years (including extensions). The project is planned to be placed in service in 2010. Design and development of this facility is well underway, but it will not be built unless investors are certain that the facility will be eligible to receive the PTCs under the placed-in-service date window.

I urge this committee to extend the qualifying period for the Section 45 closed-loop biomass energy production tax credit by at least five years to enable developers of this type of technology to make investment decisions with the knowledge that these important incentives will be in place when such a facility comes on-line.

Again, we appreciate the opportunity to provide this information. If Members, or staff, have any questions regarding the technology, we would be pleased to serve as a resource to the Committee on closed-loop biomass issues.

Statement of Plug Power Inc., Latham, New York

My name is Dr. Roger Saillant, President and CEO of Plug Power Inc., a Latham, NY-based company that is a leader in the development of on-site energy systems utilizing proton exchange membrane ("PEM") fuel cells for stationary power, emergency backup power and material handling applications. Plug Power espouses the values of sustainability and is developing and commercializing fuel cell systems that contribute to the United States' energy independence.

Plug Power would like to thank the Members of the Committee for the opportunity to submit testimony in favor of including commercial and residential fuel cell credit extensions in the energy legislation being advocated by Congressional Leadership. Also, let me thank you for your initiation of these credits in the Energy Policy Act of 2005 and for providing a one-year extension of the credits last year.

We have been advocating tax credits for fuel cells in both residential and commercial use since 1999 and have been working closely with our Congressman, Michael McNulty, who has introduced legislation in each Congress since that time. Thanks in large part to Rep. McNulty's steadfast leadership, and to the support in this Committee, today we have the credit in existing tax code.

Fuel cell tax credits currently in existence are critical for our fledgling industry. This credit targets stationary and portable fuel cell technologies and it has been our intention that the credits apply to all non-mobile applications that meet the credit criteria of efficiency and size. These applications are the precursors to the fuel cell vehicle and a low or no-carbon transportation and energy generation future. In fact, at Plug Power, our vision is one of a sustainable and renewable future, and we believe that such a future cannot occur without fuel cell conversion devices. Renewable energy sources are, unfortunately, not readily adaptable to the transportation market, but through fuel cells, can supply that motive power. In addition, some renew-

able energy sources are intermittent, and fuel cells allow for the storage and use of that energy power at all times.

Plug Power support H.R. 550 and its companion bill S. 590, the Securing America's Future Act. This bill extends both the fuel cell and solar tax credits and provides those credits through 2016. The long term nature of the fuel cell credit is critical. First, it recognizes the evolution of the range of fuel cell technologies and products. This is not akin to providing a credit for a "highly efficient motor". It is more like a credit for highly efficient motors, power generators, battery replacements, forklifts, back up power units, critical load providers, loaders, and so on. You get the idea: fuel cells need a long term credit because we are talking about a VERY wide variety of products.

The long term nature of the credit is also important because it allows us to: reduce our manufacturing costs, invest in our manufacturing facilities with confidence, give security to our manufacturing base, build confidence in our supply base, and importantly, provide time for the long term planning that is often involved in building and siting fuel cell technologies. Like solar, we have some large scale systems and/or some aggregations of systems that takes a long time to gain approvals and otherwise be ready for installation.

H.R. 550 also calls for relief from the Alternative Minimum Tax, which some of our commercial credit customers have requested. Ours is a fledgling industry but one in which there are at least 30 products now available. We must find ways to get our fuel cell systems into customer hands, and the tax credit is proving to be a very valuable tool. We believe that, once customers have enough experience with fuel cell systems, they will want to use them to replace existing, and in many cases, inferior technologies. We cannot rely on the credit as a tool for gaining experience with fuel cells if our customers cannot even take advantage of that credit.

For the fuel cell portion of H.R. 550, it continues to allow telecommunications customers to take advantage of the credit. We support the continuation of this provision.

We are very encouraged by the support of H.R. 550 to date and urge its passage as part of any comprehensive energy legislation. The credit of 30% capped at \$500 per half kilowatt is just enough to encourage cost reductions and leverage early sales, yet not so much that we are installing technologies that are not yet ready for commercial introduction.

Again, Plug Power thanks you for the opportunity to provide testimony and for your support to date of fuel cell tax credits.

FUEL CELL DESCRIPTION

A fuel cell is an on-site power generation system that electrochemically combines hydrogen with oxygen in the air to form electricity. Hydrogen fuel can be generated by electrolyzing water with low-cost off-peak electricity, or with electricity obtained from renewable sources such as solar, wind, or biomass. This makes such fuel cell systems highly efficient as well as environmentally friendly. The heart of stationary or portable PEM fuel cell system is the stack, which is comprised of the same technology as is used in most fuel cell vehicle applications.

STATIONARY, BACKUP AND PORTABLE FUEL CELL BENEFITS

- In backup applications, fuel cells can provide power for critical infrastructure such as communication systems and water utilities.
- Fuel cells used in materials handling applications offer a clean and highly efficient alternative to the current battery solutions.
- Fuel cell systems are designed to stringent standards developed by the telecommunications industry that qualify equipment under extreme environmental conditions and requires specific levels of technological resiliency including temperature extremes, wind-driven rain, altitude, earthquake and ballistics tolerance.
- Fuel cell technology operates with very low audible noise, 60dba@1m, in stark contrast to traditional combustion systems, which typically operate at 70db@7m.
- Our traditional central generation model for supply of power in the U.S. is failing to meet the needs of a growing economy with increasing demand for high-quality power. There are weaknesses in both power generation and transmission and distribution infrastructure that can best be met with the new paradigm of distributed generation: placing the generating assets on site, where the energy is needed. Fuel cells will be an important technology component of our nation's distributed generation portfolio as issues of energy security become more critical.

- When fueled by hydrogen from a renewable energy source such as solar, wind, or hydropower, or if the fuel source is bio-fuel like ethanol from plant wastes, CO₂ emissions are net zero.
- Fuel cells can provide highly reliable electricity. Some studies estimate that power quality and reliability issues cost our economy alone as much as 150 billion per year in lost materials and productivity, while others have reported estimates as high as 400 billion per year.
- Unlike traditional combustion technologies, fuel cell systems are designed to require only one preventive maintenance call per year to ensure full capability and performance.
- Because fuel cells provide electricity at the site of consumption, they reduce the load on the existing transmission and distribution system. Siting the fuel cells at the point of consumption also avoids the line losses (up to 15%) inherent in moving electricity and provides an alternative to costly and unattractive traditional power lines. Provides critical backup when grid power is unavailable due to weather related outages and can carry the load at the site of consumption until grid power is restored.

A HYDROGEN ECONOMY

Both stationary and mobile fuel cell systems are the ideal technologies to transition to a fully sustainable energy future based on hydrogen. Vehicular and stationary fuel cells, taken together, provide the impetus for development of a hydrogen infrastructure in the United States and move us to natural capitalism. This technology, like other innovative transportation options, is cursed with the “chicken or the egg” question. That is: what comes first, the infrastructure or the fuel cells? By developing both stationary and transportation applications with the ability to refuel on a small scale, demand can be generated by multiple product applications and provide a stronger incentive to develop a full-scale hydrogen infrastructure. By way of example, our company is exploring a home refueling station that would fuel, via hydrogen, the family automobile as well as provide the electricity and heat for the home. One can imagine the early adopters buying a fuel cell car and a home refueling station at the same time.

Statement of Technology Network

Chairman Neal, Ranking Member English, and Members of the Subcommittee, on behalf of The Technology Network (TechNet), I am privileged to provide testimony on the important issue of energy and tax policy and specific issues related to the current framework of tax incentives encouraging the development of alternative sources of energy.

TechNet was created in 1997 to shape public policy impacting U.S. innovation and technology leadership and today is the preeminent organization representing chief executive officers of the nation’s leading high technology companies. Chaired by John Chambers of Cisco Systems and John Doerr of Kleiner Perkins Caufield & Byers, TechNet’s CEO and senior executive members are the nation’s leading innovators in the fields of information technology, Internet and e-commerce, biotechnology, venture capital and investment banking. TechNet’s top priority is to foster public policies and private sector initiatives that maintain U.S. competitiveness and economic growth through innovation.

Recognizing the nation’s energy and environmental challenges and the enormous potential of innovation as the solution to these challenges, TechNet established a Green Technologies Task Force comprising senior executives of leading innovation companies to identify key public policies and industry initiatives that will spur the development and adoption of new technologies to enhance energy efficiency, encourage use of renewable energy and protect the environment.

The TechNet Green Technologies Initiative represents TechNet’s longstanding commitment to policies that strengthen the nation’s innovation-driven global competitiveness.

Among the key recommendations of the TechNet Green Technologies Task Force is the need to adopt fundamental reform of federal tax policy with the goal of encouraging the development, commercialization and adoption of new energy technologies.

We appreciate the Subcommittee’s leadership in exploring how tax policy can more effectively drive innovative green technologies and alternative sources of energy. Indeed, we believe this should be among Congress’s leading priorities because

of the tremendous potential that such policy changes hold for U.S. economic competitiveness, national security and the global environment.

Several provisions of the current tax code provide incentives for investment in and deployment of renewable energy sources or alternative fuels. These include:

- Production Tax Credit, providing a 1.5-cent/kWh credit for wind, solar, geothermal, and “closed-loop” bioenergy facilities (adjusted for inflation, the 1.5 cent/kWh tax credit is currently valued at 1.9 cents/kWh).
- Investment Tax Credit, providing a federal income tax credit worth 10% of initial investment cost for certain solar, geothermal, or qualifying biomass facility and a 30% credit for some solar or fuel cell investments and residential projects, with various caps applying to different applications.
- Volumetric Ethanol Excise Tax Credit (VEETC), providing ethanol blenders and retailers with .0051 per percentage point of ethanol in the blend on a volumetric basis (E10 is eligible for \$.051/gal). VEETC also provides a credit of \$.01 per percentage point to blenders of two types of biomass-derived diesel fuels fatty-acid methyl esters derived from virgin oils/fat and diesel derived from biomass via a thermal depolymerization process), and \$.005 per percentage point to blenders of fatty-acid methyl esters derived from recycled oils/fats.

We applaud the leadership of this Subcommittee in advancing these incentives. They are an important first step in securing our nation’s energy future. However, more remains to be done.

Federal incentives including tax credits, loan guarantees and other programs are critical to the early success of energy technology projects which in many cases incur substantial up-front costs to generate electricity in lieu of high ongoing fuel costs. Investors or consumers face significant capital investments to develop or install such technologies, creating a need for creative financing solutions particularly for larger-scale commercial installations.

The convergence of computing, communications and data; digital technologies and broadband-enabled networking that has revolutionized industries from communications to e-commerce to manufacturing to finance is beginning to transform the energy sectors in the United States and abroad. Technologies that were unimaginable ten years ago are widely available today.

The federal tax code’s existing incentive programs, however, have not kept pace with the dramatic rate of technological advances. The current tax code is not optimally designed to spur the development of new technologies. We believe that they comprise a level of incentives that is not strong enough to drive substantial new investment or significantly change consumer behavior. As a result, their impact on cutting edge innovations has been limited by constraints including the timeframe and structure of these incentives.

As a fundamental matter the current federal tax code has historically favored conventional fossil fuels, which have received billions of dollars in federal subsidies each year. According to General Accountability Office data, the U.S. petroleum industry received between \$134.9 and \$149.6 billion in tax incentives between 1968 and 2000, as a result of various programs including expensing of exploration and development costs, alternative fuel production credits and other incentives. Predicted benefits to the oil and gas industries resulting from just the incentives included in the Energy Policy Act of 2005 totaled \$6 billion.

Because current tax incentives are structured in a manner that continues to advantage traditional energy sources, we believe that federal tax policy will not significantly change patterns of energy production or consumption unless we commit to a fundamentally new approach.

To be truly effective in addressing our nation’s critical energy challenges, our tax system must be modernized so that it accelerates the rate of change for bringing energy technology solutions to market. Significant reform is necessary even to achieve parity in terms of the support for new technologies relative to incumbent energy sources, but we should do more.

Similar efforts by other nations have yielded substantial results. Comprehensive and strategic policies to create sustainable markets for renewable energy technologies have had far-reaching success in Germany, Spain, Japan and other nations that now benefit from robust alternative energy industries. In each case, an unwavering high-level commitment to a fundamental shift in strategy has led to sustained investment in and adoption of new energy technologies.

Achieving fundamental reform of our current tax system will be a complex undertaking that demands thoughtful and detailed policy change. We believe, however, that we can and must do more to expand markets for innovative technologies and to accelerate the development of new innovations through technology-neutral tax policies.

Piecemeal programs and incentives will not drive fundamental changes in behavior necessary to change patterns of energy supply and demand. Above all, we need a comprehensive, strategic and sustained approach to tax policy that drives supply and demand for new energy technologies so that they are developed and utilized at a scale that can make a significant impact.

We recommend the following reforms as a starting point for a new approach:

1. Restructuring incentives to ensure market signals drive new technologies

Structural issues significantly impact the effectiveness of existing tax programs in spurring new technologies. Our current tax code includes various alternative energy incentive programs, each of which applies to certain specified energy technologies but not to others.

Some of these incentives are subject to caps and other specified limitations. For example, federal law currently provides a 30% investment tax credit for solar installations, but residential systems are capped at \$2,000 under the credit. As a result, even modest residential solar installations receive relatively little incentive under the program.

Similarly, the investment tax credit includes a \$1,000 per kilowatt cap for fuel cells for both commercial and residential installations. In addition, incentives for manufacture of fuel-efficient vehicles impose an annual cap on the number of eligible hybrid vehicles.

Tax incentives for alternative fuels are similarly structured to encourage specific technologies rather than technologies that meet performance goals. Tax incentives are available to companies (including oil companies, fuel distributors and others) that blend biofuels with conventional fuels for distribution. Existing credits apply to alcohols, fatty-acid methyl esters and diesel derived from biomass using a thermal depolymerization process.

Existing credits for biofuels are based on volumetric blend percentages (i.e. the percentage of biofuel in the finished fuel). Using a volumetric basis grants an advantage to relatively low energy content fuels despite the advantages of higher energy content fuels that include increased range and lower emissions. As a result, current tax incentives favor less energy dense fuels such as ethanol over fuels with higher energy content such as butanol and other high-alcohol content fuels.

In addition, novel biofuels that do not fall within the chemistries or processes specified within the tax code are not eligible for the tax credits. These include such promising technologies as biomass derived and biochemically produced hydrocarbons. Furthermore, biofuels derived from feedstocks that result in significantly lower greenhouse gas emissions are not granted any additional incentive over those derived from conventional feedstocks.

In short, current tax policy picks winners and losers. The structure and value of existing incentives is not driven by an overarching strategy to impact energy security or reduce harmful emissions but is primarily a reflection of the political clout of various industry sectors or even individual companies.

Federal tax policy can be significantly more effective in addressing national energy and environmental priorities by driving new technologies if it is restructured in a manner that encourages a range of innovative technologies and enables the market to drive the growth of these technologies.

We recommend the establishment of robust, long-term incentives that are available to promising technologies that meet specified performance-based criteria. Such criteria may include, but are not limited to, minimum efficiency standards, reduced emissions of greenhouse gases or other pollutants, low-emissions or low-fossil fuel reliance in production processes, reduction in petroleum usage and similar factors consistent with energy and environmental policy goals.

We believe that certain novel approaches to achieving market-driven incentives also merit consideration. Linking federal support for biofuels to changes in the price for oil, for example, will cause tax incentives for biofuels production to increase as oil prices decrease. This approach will enable alternative fuels to compete more effectively, while preserving federal support when it is not needed (i.e. when oil prices rise to a point at which biofuels are competitive).

2. Long-term, consistent approach

To drive substantial private sector investment, we need stable, long-term and predictable incentives. We support a minimum 5-year timeframe for clean energy tax credits.

We believe this is the minimum amount of time necessary to enable rational investment decisions and a reasonable period of time given budget constraints that

impact tax policy. This minimum timeframe will allow for economies of scale in the development, deployment and cost of renewable energy sources.

The federal regulatory environment's support for energy technologies can be significantly improved by establishing consistency and predictability. The effectiveness of existing incentives is significantly limited in driving development of projects with long lead time, particularly given the pace of development and consumer adoption of energy technologies. In most cases, existing tax credits or incentives are short-term, piecemeal programs subject to the uncertainty of the Congressional reauthorization and/or appropriations processes. For example, the production tax credit for renewable energy, established in 1992, has been subject to three expirations and several short-term extensions (some retroactive), most recently through December 2008.

Energy policy and its urgency have fluctuated with changing energy prices. A sound national energy strategy must include long-term, stable policies that accelerate development and adoption of new technologies including next-generation technologies.

3. Consumer incentives that change patterns of demand

The federal tax code can do more to change consumer behavior consistent with the development and commercialization of new technologies. The tax code can significantly change consumer behavior, driving demand in pace with supply, by shortening the payback period for installation or adoption of new technologies.

Incentives currently exist for manufacturers and consumers of energy efficient appliances, including refrigerators and dishwashers. Industry has partnered successfully with the Federal Government for many years to establish effective market-based programs and initiatives, such as the Department of Energy-Environmental Protection Agency Energy Star program, which have been effective in informing consumers about energy usage and encouraging the development of energy efficient products.

Currently, some states offer generous incentives for consumer purchase and installation of energy technologies while others have no such incentives. Federal policy should establish greater consistency in consumer demand for energy technologies.

4. Technology neutrality and support for a balanced portfolio of technology

Solutions

The importance of technology neutrality and the need to develop a portfolio of technology solutions that is balanced cannot be overemphasized. In particular, we note that more established energy technology solutions continue to make tremendous gains in cost reduction and effectiveness. These technologies, including solar, fuel cell and wind technologies, have not yet met their full potential. In the case of some established clean technologies, a lack of widespread consumer adoption has a counterintuitive effect of fueling consumer skepticism that should be addressed.

To the greatest extent possible, federal policy should establish a level playing field through performance-based criteria that enable all promising energy technologies to compete. Ultimately, the marketplace should pick technology winners and losers.

Conclusion

There is an unprecedented degree of consensus today that our nation faces energy challenges that will impact our economic competitiveness, national security and the global environment unless we take significant steps to chart a sound energy future.

Energy tax policy—and specifically, policies that encourage novel and innovative new energy technologies—is among the most important means of driving fundamental change in our energy supply and demand. We deeply appreciate the Subcommittee's leadership and encourage your continued resolve to make bold changes that will enable us to surmount our nation's critical energy and environmental challenges. TechNet is committed to supporting the Subcommittee in this important effort.

Thank you for your consideration.

Statement of United Corrstack, Incorporated

Introduction

On behalf of United Corrstack, Incorporated ("UCI"), I am pleased to provide this statement in connection with hearings on energy tax policy conducted by the Select Revenue Measures Subcommittee on April 19 and 24, 2007. I wish to comment on

two objectives I believe are important for Congress to consider as it continues work on tax credits and other incentives for the development of alternative energy technologies. Those two objectives are, first, to ensure that tax credits will be available for a sustained period of time and, second, to ensure that a standard tax credit rate is available to as broad a spectrum of alternative energy technologies as possible.

Several bills dealing with tax credits for alternative energy technologies have been introduced. H.R. 197, introduced by Rep. Earl Pomeroy, would extend the production tax credit for electricity produced by renewables for another five years. While this would be helpful, I recommend careful attention to two other bills, H.R. 1924, introduced by Reps. Kendrick Meek and Wally Herger, and H.R. 2001, introduced by Reps. Jay Inslee and Lee Terry. These would be particularly beneficial to my company, which is developing a biomass-fired cogeneration plant adjacent to our paper mill. However, I recognize that other technologies also deserve support and encourage the Committee to take a broad and equitable approach to encourage alternative energy technologies as it confronts the challenges of climate change, energy efficiency, the security of energy independence, and economic growth.

Background on United Corrstack, LLC

Before discussing the effect of the production and investment tax credit issues on our company, I first would like to describe our operations. United Corrstack ("UCI"), located in Reading, Pa., has been in business since 1993 and is a subsidiary of Interstate Resources, Inc. ("IRI"), a privately-held corporation based in Arlington, Va. that owns and operated several paper mill and package-making facilities throughout the eastern United States. UCI is a paper mill that produces recycled corrugating medium in a range of weights between 23 and 33 lbs. Our paper product is sold on a wholesale basis to many package-making facilities primarily within a 150-mile radius of Reading, Pa. Our annual sales are approximately 50 million. We have 75 direct employees and our activities result in indirect fulltime employment of more than 30 other workers. Our direct employees work in a union shop, with union-scale wages and benefits. UCI prides itself on producing the highest quality paper, providing superior customer service and maintaining a strong and positive presence in the Reading area.

Corrstack's Energy Challenge

Since we began operating, we have been 100 percent dependent on fossil energy purchased from local utilities. We purchase 9 MW per day of electricity from our local electric utility. In addition, we purchase approximately 5mm gallons No. 2 fuel oil or equivalent natural gas per year to heat the boilers that produce steam for our paper processing machines.

In the first (8) years of our plant's operation, the cost of electricity, oil and natural gas was reasonable enough that our operations were sufficiently profitable. However, during the past five years, our energy costs have nearly doubled. Last year alone, we paid more than \$11 million for energy. Since our product is priced as a commodity traded on an open exchange, we cannot pass these higher energy costs onto our customers. These higher costs have cut into our margin, thereby challenging our plant's profitability.

We do not blame our local utilities for these higher costs since they are forced to pass on their own escalating wholesale costs to retail customers like us. Still, we found ourselves having to take action in order to maintain the employment and economic viability of our facility.

Concurrently with rising utility costs burdening our facility, our region has had to deal with another problem, how to dispose of ever-increasing volumes of waste that for years has been transported to landfills both local and in other states. With these landfills now operating at near capacity, United Corrstack viewed these dual problems of higher energy costs and near-capacity landfills as a problem that could be turned into an exciting opportunity.

Creating a New Path Forward

We plan to break ground soon on a 30 MW biomass-fueled cogeneration plant that will allow us to generate our own steam and electric power for use in our paper mill in Reading, with excess power being sold to the local utility replacing additional fossil fuel generated electricity. The plant is expected to come on line in the third quarter of 2008. We expect that the successful operation of this plant will save our company approximately 3-4 million per year in natural gas and electricity costs.

The proposed plant is the first of its kind in the northeast and is an innovative approach to clean energy. The facility will use a circulating fluidized bed (CFB) boiler for fuel flexibility, low emissions and high efficiency in a cogeneration process for maximum thermal efficiency. It will burn about 800 tons per day of biomass fuel from waste sources, including pallets, railroad ties, paper sludge, residual wood and

various construction and demolition residue. In addition, about three per cent of the waste to be used as fuel will be burlap and other wastes from the local Hershey Chocolate facility. Our goal is to reduce the consumption of purchased natural gas and No. 2 fuel oil by at least 85 per cent.

The steam energy produced will be sufficient not only to serve our existing paper mill, but a new mill that we expect to construct within a few years. We also will have sufficient residual electrical power to sell to our local utility. We are bearing the infrastructure expense of constructing a new substation, interconnect equipment, and new transmission lines to accommodate that exchange of electricity.

The production of power and steam in this new facility will be subject to strict environmental guidelines administered by the Pennsylvania Department of Environmental Protection. We expect the DEP to issue our permit in early June. Groundbreaking will take place shortly thereafter. The facility is expected to come on line in mid 2008. It will maintain 75 jobs and create up to 150 new jobs in the Reading area.

The Value of the Production Tax Credit

Under current law that expires at the end of 2008, we qualify for a modest production tax credit that would result in about \$1.2 million per year. The rate under which we qualify is half the rate available to other renewable and energy efficiency technologies such as wind and geothermal. Also, current law only applies to half of the types of biomass, such as residual wood and pallets.

The legislation proposed by Reps. Meek and Herger would help us by equalizing the production tax rate for open-loop biomass to the level that applies to wind and geothermal. However, even though the Meek-Harger bill would give us the full rate equivalency, it still would only apply to half the fuel we use since the definition of biomass under the current tax code is limited.

The legislation proposed by Reps. Inslee and Terry takes a different approach. It would create a new classification under the tax code for combined heat and power sources and make it eligible for a 10 per cent investment tax credit. The Inslee-Terry bill may benefit us more since the 10 per cent investment tax credit would apply to our entire production process. We understand that if both bills are enacted, we would have to choose which one is better for our facility. We would make that decision at the appropriate time. However, the Committee may wish to consider making both the investment and production tax credit provisions, or at least some elements of both provisions, available so that other worthy biomass-fired cogeneration plants can become more attractive to investors.

We believe the cogeneration process we will use at our site merits equal treatment with these other sources. Beyond the help that either bill would provide us, however, there is another reason to encourage more of these facilities nationwide.

The use of biomass fuel in a clean-burning, advanced technology combined heat and power (CHP) system such as the one we are developing at United Corrstack should be encouraged in any change to the tax code contemplated by Congress. The thermal efficiency rating of CHP systems exceeds 60 per cent while the thermal efficiency rating of conventional coal-fired utility plants rarely exceeds 30 per cent. This is because a CHP system utilizes excess steam for industrial process rather than let it escape into the atmosphere as is the case with conventional coal-fired plants.

In addition, biomass has certain benefits that fossil fuels do not. Biomass is as dependable and plentiful a resource as the sun, wind and water. Biomass is carbon neutral because it creates its carbon by absorbing CO₂ and, unlike typical fossil fuels, it contains very little sulfur and metals. If there is any drawback to biomass, however, it lies in how the biomass fuel is brought to the power plant. While there is a substantial interstate transmission pipeline system to ship natural gas and oil, there is no comparable long-distance shipping capability for biomass. We are negotiating with trucking companies that can bring us the biomass fuel we need for the next two to three years. Beyond that, however, we cannot be certain. Therefore, an increase in the production tax credit would provide protection for our capital investment by giving us a financial cushion to offset escalating transportation costs.

Conclusion

Our plant is unique in the northeast, not only because we are using biomass from local sources that otherwise would go to landfills, but because we are complying with the strictest environmental protection standards. We believe our facility will be a prototype that can be used elsewhere in the country. I want to emphasize that we have made the decision to proceed with construction of our biomass cogeneration facility regardless of whether the current tax credit provisions remain unchanged. Nevertheless, because of fuel supply and other risks we are taking, we strongly believe Congress should act to provide longer term stability in the provision of tax

credits for renewable, combined heat and power and other alternative energy resources. This not only would be good for United Corrstack, it would help the growth of alternative energy resources elsewhere.

Thank you for the opportunity to provide these comments.

Statement of UTC Power

UTC Power appreciates this opportunity to submit a statement for the hearing record on the impact of energy tax policy on advanced energy technologies.

Summary

Our comments regarding energy tax incentives are based on UTC Power's portfolio of ultra clean, highly efficient, reliable onsite power generation technology solutions. While the technologies employed by our products are diverse, they are similar in their ability to address the nation's need for clean, efficient, reliable, continuously available base load power. UTC Power's onsite power generating equipment such as our PureCell™, PureComfort™ and PureCycle® systems compete against the well established and heavily subsidized electric grid. Distributed generation technologies such as ours offer enhanced energy security and stability. By splitting energy requirements between the electric grid and the natural gas grid, we provide our customers with an effective risk management strategy.

From a policy perspective, UTC Power as well as our supplier base and customers purchasing any of our onsite power generation products would benefit from stable, long term government policies that provide meaningful levels of incentives over a known timetable for the maximum period possible. There are three specific federal energy tax incentives of interest to UTC Power that were included in the Energy Policy Act (EPAct) of 2005 and extended until 12/31/08:

Sec 48 Fuel cell investment tax credit;
 Sec 48 Microturbine investment tax credit; and
 Sec 45 Geothermal production credit.

In all three cases, the volumes for products associated with these incentives are low and potential suppliers and customers are risk adverse. Long term certainty and a meaningful level of incentive are absolutely essential. We urge Congress to pass legislation this year that provides long term extensions (a minimum of five years) for federal incentives that will assist in the commercialization of these products; make several revisions; and clarify key implementation issues. We support HR 550 and HR 197 that provide more specifics on the extensions and revisions to the existing incentives that we endorse.

Company Background

UTC Power, a business unit of United Technologies Corporation (UTC) is a world leader in commercial stationary fuel cell development and deployment. UTC Power also develops innovative combined cooling, heating and power applications for the distributed energy market. Since 1991, UTC Power has installed more than 260 fuel cell systems in 19 countries around the world. UTC Power's PureCell™ 200 system provides base-load power and can operate connected to or independent from the grid and also switch between modes automatically or on command. The PureCell™ 200 system operates seamlessly during grid outages. Additionally, it is one of the cleanest power sources available today.

UTC Power also develops innovative combined cooling, heating and power applications for the distributed energy market. One example is the PureComfort™ power solution, an ultra-efficient natural gas driven combined cooling, heating and power solution capable of satisfying energy needs with or without the grid. It is flexible, environmentally benign and can reach efficiencies in excess of 80 percent. PureComfort™ power solutions consist of microturbines and a double-effect absorption chiller/heater from our sister UTC division the Carrier Corporation. When a UTC Power system is integrated with a facility's central heating or cooling system, the efficiencies can exceed 80 percent, resulting in substantial energy cost savings.

In addition, UTC Power is developing an organic Rankine cycle product known as the PureCycle® system for geothermal and other energy resources. This technology is in the development stage. We are partnered with Chena Hot Springs Resort outside of Fairbanks Alaska, the Department of Energy and Alaskan authorities in validating this exciting new geothermal technology. Operating with geothermal water at 165° F, this project has featured the use of the lowest temperature geothermal energy resource in the world. On April 12, 2007 we announced a series of

agreements with Raser Technologies of Provo, Utah to provide up to 135 PureCycle® systems for three Raser power plants. In total, these systems will generate approximately 30 megawatts of renewable electrical power.

Energy Efficiency and Renewable Energy are Key to Meeting Increasing Energy Demands, But U.S. Policies are Not Adequate to Meet the Challenge

A December 2006 Government Accountability Office (GAO) study entitled “Key Challenges Remain for Developing and Deploying Advanced Energy Technologies to Meet Future Needs” indicates: “U.S. electricity generation will grow from 3,900 billion kilowatt hours in 2005 to 5,500 billion kilowatt hours in 2030.”

How will our nation meet this demand with minimal environmental impact?

A recent report by the American Council on Renewable Energy “The Outlook on Renewable Energy in America” states that 500 to 700 gigawatts of new renewable energy supplies could come from U.S. renewable sources by 2025. The American Solar Energy Society also did a study “Tackling Climate Change in the U.S.: Potential Carbon Emission Reductions from Energy Efficiency and Renewable Energy by 2030” and found U.S. greenhouse gas (GHG) emissions could be reduced between 60–80% by 2050 if appropriate incentives were provided.

Advanced energy technologies such as UTC Power’s PureCell™, PureComfort™ and PureCycle® systems face significant hurdles in gaining acceptance including a risk adverse market and initial high costs driven by low volumes. We welcome the recent actions by Congress to provide incentives for fuel cells, microturbines and geothermal energy production in the 2005 Energy Policy Act (EPAct) and last year’s action to extend these three credits until 12/31/08. However, these efforts are not sufficient to address the challenges we face as a company, industry or nation.

The GAO report concluded: “It is unlikely that DOE’s current level of R&D funding or the nation’s current energy policies will be sufficient to deploy alternative energy sources in the next 25 years that will reverse our growing dependence on imported oil or the adverse environmental effects of using conventional fossil energy. The report added: “In addition, the duration of certain federal tax incentive has been insufficient to stimulate investment decisions to deploy advanced energy technologies. . . . The credit’s duration is key to encouraging companies and their lenders to undertake the substantial investments and build an industry over time.” UTC Power’s experience in the marketplace confirms these conclusions.

Fuel Cell Investment Tax Credit

A fuel cell investment tax credit was established in EPAct 2005 for business and non-business property owners. It provides a credit of \$1,000 per kilowatt installed cost or 30 percent of project cost, whichever is less. The original sunset was 12/31/07, but this was extended until 12/31/08 in the Tax Relief and Health Care Act of 2006.

UTC Power is investing more than \$100M total in a 5 kW fuel cell system for the critical back up power market and a new 400 kW stationary fuel cell product that will have twice the life and double the output at half the cost of our current PureCell™ 200 kW system. The PureCell™ Model 5 power system is currently available as a pre-production product with commercial availability in the 2008 timeframe. The PureCell™ 400 system is scheduled for market launch in early 2009. The fuel cell tax credit is set to expire just as these products will be entering the market which generates considerable uncertainty for us, our suppliers and potential customers. Extension of the credit this year is therefore critical to the commercial success of these products.

In addition, there are a number of issues related to implementation of this new credit that require clarification including: the use of the federal credit in connection with state incentives; applicability to certain markets; transference of credits so non tax paying entities can access the incentives; and eligibility for customers located in U. S. territories.

Microturbine Investment Tax Credit

The microturbine investment tax credit was created at the same time as the fuel cell provision noted above for business property owners. It provides \$200 per kW installed cost or 10 percent of total project cost, whichever is less.

Our microturbine based systems provide cooling, heating and power. These products face the same risk adverse, low volume, high cost dynamics as fuel cells. Given the low emissions, plus high efficiencies of these systems and their ability to provide assured power, there is significant customer and public benefit in their deployment. Both fuel cells and microturbines share the same need for certainty and longevity with regard to federal financial incentives.

In addition to the clarification issues associated with fuel cells, we also would seek a technical correction to the statute explicitly stating that the microturbine credit

applies to the entire combined cooling, heating and power system and not just the microturbine component.

Geothermal Production Tax Credit

The EPAct also made geothermal energy production eligible for the Sec. 45 federal Renewable Electricity Production Tax Credit (PTC). This incentive is adjusted for inflation and currently provides 2.0 cents per kWh for energy produced from geothermal resources. A taxpayer may claim credit for the 10-year period commencing with the date the qualified facility is placed in service.

Many geothermal projects take years to develop. The PTC timeframe is too short for most geothermal projects to be completed by the current placed in service deadline. We support the Geothermal Energy Association's position that "To achieve sustained geothermal development, Congress should immediately amend the law to allow facilities under construction by the placed in service date of the law to qualify, and extend the placed in service deadline by at least 5 years, to January 1, 2014, before its expiration."

Longer Term Tax Credit Extension is Important Due to Length of Sales Cycles and Need for Certainty by Suppliers, Technology Developers, Investors and Customers

Our experience in the onsite power generation marketplace indicates that sales cycle for these advanced technologies is typically 18–24 months. Tax credits of only two years duration therefore have limited value in supporting the commercialization of these technologies.

Volumes for our onsite power generation solutions are low in these early years of the commercialization process. This translates into initial costs that are higher than conventional technology since overhead is spread over a smaller base. Low volumes also make it difficult to attract the needed supplier investment in capacity expansion, tooling and equipment since they face the risk of never returning a profit. These risks can be mitigated somewhat by the knowledge that federal incentives will be available to help defray the costs of initial product deployment and help promote market penetration.

Our parent company, United Technologies Corporation (UTC) is one of the nation's largest investors in R&D (3.2B in 2006) for products such as aircraft engines, helicopters, air conditioners, elevators and escalators that operate for decades. We need as much certainty as possible regarding government policies, regulations and incentives so we can deploy our assets for maximum public benefit and shareholder value.

Smaller companies including many of our suppliers don't have these advantages and therefore are even more vulnerable than we to market changes. Our suppliers have an even greater need for certainty if they are to make investments in tooling, facilities and equipment that will support our products.

Conclusion

Water never boils if the heat is turned on and off. Many have highlighted the problems associated with the uncertainties of tax credits of short duration and the "on again off again" nature of the production tax credit. Testimony presented in a recent Senate Finance Committee hearing pointed out that five two-year tax credit extensions are not equal to one ten-year extension. There is a compelling need for assurances that government policies with regard to support for advanced energy technologies will be stable and consistent with a long term perspective. We urge Congress to enact the most robust and longest term extensions possible for these important advanced energy technologies so their benefits can be realized by mainstream America.

